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NO. 3

UNITED STATES NAVAL
MEDICAL BULLETIN

PUBLISHED FOR THE

INFORMATION OF THE MEDICAL DEPARTMENT OF THE SERVICE

ISSUED BY
THE BUREAU OF MEDICINE AND SURGERY
NAVY DEPARTMENT
DIVISION OF PUBLICATIONS
SURGEON J. S. TAYLOR, U. S. NAVY
IN CHARGE

JULY, 1917

(QUARTERLY)

WASHINGTON
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NAVY DEPARTMENT,
Washington, March 20, 1907.

This UNITED STATES NAVAL MEDICAL BULLETIN is published by direction of the department for the timely information of the Medical and Hospital Corps of the Navy.

TRUMAN H. NEWBERRY,
Acting Secretary.

NOTE.

Owing to the exhaustion of certain numbers of the BULLETIN and the frequent demands from libraries, etc., for copies to complete their files, the return of any of the following issues will be greatly appreciated:

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Volume I, No. 2, July, 1907.
Volume I, No. 3, October, 1907.
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PREFACE.

The publication and issue of a quarterly bulletin by the Bureau of Medicine and Surgery contemplates the timely distribution of such information as is deemed of value to the personnel of the Medical Department of the Navy in the performance of their duties, with the ultimate object that they may continue to advance in proficiency in respect to all of their responsibilities.

It is proposed that the Naval Medical Bulletin shall embody matters relating to hygiene, tropical and preventive medicine, pathology, laboratory suggestions, chemistry and pharmacy, advanced therapeutics, surgery, dentistry, medical department organization for battle, and all other matters of more or less professional interest and importance under the conditions peculiar to the service and pertaining to the physical welfare of the naval personnel.

It is believed that the corps as a whole should profit, to the good of the service, out of the experience and observations of the individual. There are many excellent special reports and notes beyond the scope of my annual report being sent in from stations and ships, and by communicating the information they contain (either in their entirety or in part as extracts) throughout the service, not only will they be employed to some purpose as merited, but all medical officers will thus be brought into closer professional intercourse and be offered a means to keep abreast of the times.

Reviews of advances in medical sciences of special professional interest to the service, as published in foreign and home journals, will be given particular attention. While certain medical officers will regularly contribute to this work, it is urged that all others cooperate by submitting such abstracts from the literature as they may at any time deem appropriate.

Information received from all sources will be used, and the bureau extends an invitation to all officers to prepare and forward, with a view to publication, contributions on subjects relating to the profession in any of its allied branches. But it is to be understood that the bureau does not necessarily undertake to indorse all views and opinions expressed in these pages.

W. C. Braisted,
Surgeon General, United States Navy.

U. S. NAVAL MEDICAL BULLETIN.

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SPECIAL ARTICLES.

THE PLACE OF INTELLIGENCE IN MODERN WARFARE.

By Dr. HENRY H. GODDARD, Director of Psychological Research, Laboratory of Vineland Training School.

The victories of war, no less than those of peace, are frequently due to the superior intelligence of the victor. The histories of the wars of the past abound in descriptions of the ways in which generals outwitted their opponents. And yet it is safe to say that in no war in the history of the world has intelligence been at such a premium as in the present. Not only must the commanders manifest greater intelligence because of the larger units involved and the greater obstacles to be overcome, but in this war as never before, the intelligence of the individual soldier counts. Whether it be in the handling of the huge cannons, with their marvelous precision, in directing the aeroplane, or manipulating the machine guns, or whether we consider the soldier in the trench, or the sailor on shipboard, good intelligence is absolutely essential both for the conserving of the life of the individual and the accomplishment of his task, as well as for the safety of the whole group who may be dependent upon the individual action of a single soldier and the making efficient the elaborate machinery used in modern warfare.

It is most fortunate, in view of these facts, that we are now recognizing that there are mentally defective persons who can not be trained to high efficiency in any line; and secondly, that we have scientific methods for detecting weak mentality even in those individuals who are not recognized as defective by their associates. The maxim of mechanics that a bridge is not stronger than its weakest part may be applied to a certain extent to the Army and the Navy; an army made up of unintelligent soldiers would easily be defeated by a vastly smaller force. Likewise an army whose average intelligence might be high would be exceedingly weak if it had men of weak mentality in too many of the thousands of positions that are called subordinate, but which nevertheless carry considerable responsibility. For example, every soldier is liable to have sentry duty. That this may involve considerable responsibility is well understood. In such a position a moron would be a man of clay. He might be tricked into betraying the whole camp.

There are probably at least 200,000 feeble-minded males in the United States to-day, while if we include what are technically called "dull normals," we could safely double or even quadruple this number. Not all of these, by any means, are of military age, but this is at least partially if not completely offset by the fact that undoubtedly a larger proportion of these than of the normal intelligent men will seek, and unless precautions are taken, will secure enlistment. This is because mental defectives are attracted by the excitement and spectacular features of warfare, and secondly because they are the people that can be most easily spared from their home communities. The present selective conscription will undoubtedly corral most of these people. Therefore, it becomes highly important that the enrolling officers should understand the situation.

The first point to be emphasized in this connection is that these people can not be detected by their physical appearance. The most dangerous group of the mental defectives are those who are in no way different in outward appearance from the intelligent man; and not only in outward appearance, but in conversation and bearing, these people often pass for normal. They are thought to be simply untutored, and it is supposed that training will bring them up to standard. But that such is not the case is testified to by the presence of hundreds of such cases in our institutions for the feeble-minded, and by thousands of others who are not in institutions, but who are recognized by those who know the feeble-minded, as being mentally weak.

Accepting these facts the next question is, What is to be done? The first thing is, of course, to recognize with as high degree of accuracy as possible the mental capacity of all enlisted men. It is customary now for those who are dealing with the problem of levels of intelligence to classify people in terms of mental age, that is to say, to compare them to the average child or youth of various ages. If a half-grown boy has only the intelligence of a 2-year old baby, he is technically an *idiot*. If an adolescent youth has the intelligence of a boy of from 3 to 7, he is called an *imbecile*. If he has intelligence of from 8 to 12, or possibly 14, he is called a *moron*. A person who has only the intelligence of a normal boy of 12, or less, is considered feeble-minded and incapable of managing himself or his affairs with ordinary prudence; incapable of holding any responsible position where judgment and common sense are requisites. Next in this group come the so-called dull normals, people who can manage their affairs with a certain degree of prudence, who show some common sense and judgment, but never of a high or even average grade.

These various levels of intelligence can now be measured by various psychological methods or tests with rather a high degree of accuracy. Before describing some of these tests we may speak of some other important phases of the problem. Having discovered the mental level of the applicant for enlistment, before we decide whether to reject or accept him, it must be decided what grade or grades of intelligence can be used in the Army or Navy. A man of 12-year or even 10-year intelligence (possibly even 9, and in rare instances as low as 8), can do many forms of menial work under the direct supervision of a superior intelligence. For example, such a person could be a cook's assistant or dishwasher, can run errands, wait and tend, lift and carry, and the like. How much place there is for such persons in the Army and Navy, the officers themselves must decide. It must always be borne in mind that such persons, however useful they may be in such positions as those already illustrated, will be utterly useless in an emergency. That fact may bar them from positions where they would otherwise be satisfactory. It will be noted and must be emphasized that an important point right here is to know with some degree of definiteness the mentality of the individual. He can then be fitted to his job, if there are any jobs for that degree of intelligence.

Having decided then what levels of intelligence are useless to the Army and Navy, it becomes necessary to get rid of these people. The first and surest procedure is to have them rejected by the recruiting officer. For this purpose the recruiting officer must either himself give a mental examination, or have some one at hand who is trained, to give such an examination. There is no question that a great many incompetents can thus be shut out at the very start without adding materially to the duties of the recruiting officer or seriously complicating the present examination. A few will get by. These must be detected by the officers when they come to drill and train them. One of the main things here is that every officer shall understand that *mental incompetency explains the action of the unsatisfactory recruit more often than any other cause;* perhaps more often than all other causes put together.

Schaffer has pointed out that the feeble-minded in the German Army are the objects of mistreatment at the hands of other soldiers; they are repeatedly in conflict with discipline and military laws; they are notoriously intolerant of alcohol, and when under its influence frequently commit military crimes; they are emotionally unstable and irritable, especially characterized by unreasonable outbreaks of temper and of assaults upon their superiors. If every officer could realize these facts, he would naturally take the attitude of suspecting mental defect in the case of every unsatisfactory recruit. His suspicions could then be confirmed or removed by more careful observation and study and by psychological or psychiatric examinations.

Again we may say, having discovered that this recruit is mentally dull, it will be a question of whether there is any work for him to do within the camp or whether he should be discharged entirely.

Let us proceed now to a few details of the way in which this might be worked out. The ideal procedure would seem to be to have a psychological examiner at every recruiting station. This is manifestly impossible. There are not enough psychologists in the country and not every psychologist is a practical examiner for mental defect. There are, it is true, quite a number of teachers who have been trained to administer certain tests and who could probably be trained to do all that would be necessary in the way of testing recruits. But even if we took all available persons, there would still be too few to supply all of the recruiting stations. The next question is, can a set of tests, or system of examination be prepared which can be placed in the hands of the recruiting officers and used by them with satisfactory results. I have no question but that this can be done, though with somewhat variable degrees of satisfaction. There is, however, an intermediate procedure which might possibly prove feasible and, if so, would undoubtedly be far more satisfactory. That would be to have the people who have been trained to make these examinations employed as inspectors or instructors of the recruiting officers. They could then go from one recruiting station to another and in a very short time give the officer such help or suggestion as he might need, to give him confidence in his own work, to inform him where he had not comprehended the method, or to correct such errors as he might have unwittingly fallen into. This would be a matter of a few hours, probably a half a day at most, at any one station.

DETAILS OF THE METHODS.

It must be remembered that the great mass of the people to be examined will be passed without any hesitation. A few general questions will satisfy the officer that they are normally intelligent people. The answer to the question, "What is your occupation?" will in most cases leave no room for doubt. For example, if a man replies, "I have been for so many years traveling salesman for such a firm," nothing further is necessary. A man can not be a traveling salesman and be feeble-minded. It may be necessary to verify the answer, though, if the recruit is under oath to answer truthfully, he would probably not dare to lie. Of course, the question of what particular arm of the service he is most suited for is an entirely different matter and not under discussion in this paper. The man who has no occupation, or who replies vaguely, or who has never been employed except in the simplest kind of work, such as teamster, errand boy, etc., must be asked more questions before one is satisfied to pass him. Experience has proved clearly that school history is an excellent and safe guide. "How much have you been to school?" "What grade?" The man who has been through high school, or even part way through high school, is, with a very high degree of probability, entirely normal and may be passed. On the other hand, the man who reports that he never went beyond the fifth grade is immediately to be suspected, since it is notorious that our high-grade morons can not do sixth-grade work. A few more general questions can easily be formulated which would prove entirely satisfactory in making this first grouping—that is to say, passing the obviously normal people and holding up for further examination the doubtful and backward ones. Those who do not pass this preliminary examination could then be examined more carefully by one or more of the accepted series of tests.

The following brief scale for adults has been prepared from Terman's Stanford revision of the Binet scale:

DEPARTMENT OF RESEARCH, THE TRAINING SCHOOL AT VINELAND.

Record blank for rapid Binet-Simon testing (Stanford revision).[1]

Name	Date	Mental age
Born	Time	Life age
School grade	Examiner	Status

X.

1. Vocabulary (5 words).
2. Comprehension (2 of 3):
    - Asked opinion.
    - Something important.
    - Actions *v.* words.
3. Designs.

XII.

1. Vocabulary (10 words).
2. Dissected sentences (2 of 3):
    - Started for country.
    - Asked teacher.
    - Good dog.
3. Five digits backward (1 of 3):
    - 31879.
    - 69482.
    - 52961.

XIV.

1. Vocabulary (15 words).
2. President and king.
3. Arithmetical reasoning (2 of 3):
    - $300.
    - Pencils.
    - Cloth.
4. Problems of fact (2 of 3):
    - Hanging from limb.
    - Visitors.
    - Bicycle.

XVI.

1. Vocabulary (22 words).
2. Abstract words (3 of 4):
    - Laziness—idleness.
    - Evolution—revolution.
    - Poverty—misery.
    - Character—reputation.
3. Six digits backward:
    - 471952.
    - 583294.
    - 752638.
4. Inclosed boxes (3 of 4):
    - One large, 2 smaller, 1 inside.
    - One large, 2 smaller, 2 inside.
    - One large, 3 smaller, 3 inside.
    - One large, 4 smaller, 4 inside.

XVIII.

1. Vocabulary (28 words).
2. Paper cutting (Binet).
3. Thought of passages (1 of 2):
    - Tests.
    - Opinions.
4. Ingenuity (2 of 3):
    - 3 and 5 to get 7 (begin 5).
    - 5 and 7 to get 8 (begin 5).
    - 4 and 9 to get 7 (begin 4).

---

[1] These tests are to be administered and scored according to the procedures and standards described by Terman in "The Measurement of Intelligence." The mental age value of each test is one-half year, assuming IX as a basal year.

VOCABULARY.

1. pork.
2. outward.
3. southern.
4. lecture.
5. dungeon.
6. skill.
7. ramble.
8. civil.
9. insure.
10. nerve.
11. juggler.
12. regard.
13. stave.
14. brunette.
15. hysterics.
16. Mars.
17. mosaic.
18. bewail.
19. priceless.
20. disproportionate.
21. tolerate.
22. artless.
23. depredation.
24. lotus.
25. frustrate.
26. harpy.
27. flaunt.
28. ochre.
29. milksop.
30. incrustation.
31. retroactive.
32. ambergris.
33. achromatic.
34. perfunctory.
35. casuistry.
36. piscatorial.
37. sudorific.
38. parterre.
39. shagreen.
40. complot.

It would take probably about 20 minutes to give, and would undoubtedly prove very satisfactory.

A still briefer scale is the following, prepared by Prof. Melville and tried out by him on a small group of recruits. These results are also appended.

Mental score sheet for preliminary mental tests of recruits, industrial workers, etc.

Name.............................. Age..............................

	Credits.		*Credits.*		*Credits.*
Letter test	7-8	Adult-d. (Cut paper drawn)	10	Adult-a. (Abstract differences)	8-9
XII-e. (Disarranged sentence)	6-7	Adult-b. President and king	7-10	XV-b. (Problems of facts)	7
X-e. (Designs from memory)	5	X-c. (Comprehension)	5	X-b. (Absurdities)	5
VIII-b. (Sees lack in pictures)	4	X-a. (Arrange weights)	4.5	Form-board-A	4.5

Sum of *two* highest credits earned= , preliminary test grade.
Directions: Write number of credits earned in front of each test.
The higher credits are given for perfect performance.
Educated where?.................... Reached school year?....................

Results of preliminary mental tests in seamen's barracks, Philadelphia Navy Yard, May 12, 1917.

Number of cases.	Preliminary test grades.	Preliminary test per cents.	Provisional classification.	Totals.
1	20	100	Superior	7
3	19	95	do	
3	18	90	do	
5	17	85	Average	7
1	16	80	do	
1	15	75	do	
1	13	65	do	2
1	11	55	Border-line	
1	9	45	Inferior	1
17				17

Preliminary test grades of 14 and under indicate mental levels; grades above 14 indicate degrees of test efficiency.

Cases still in doubt could be supplemented by the Trabue completion test, the Porteus test, or other selections from dozens of well-known tests. These tests, in the hands of an expert, will also usually give indication of mental disease, as well as mental defect, so that the insane are often detected, as well as the feeble-minded and dull normal. A sheet of directions can easily be prepared for these tests which would be brief and yet entirely comprehensible by the recruiting officer and as above indicated, while the results would be fairly satisfactory in most cases, it would be greatly improved if the plan mentioned of having some trained person to go about and give a little instruction could be carried into effect. It might be desirable to have also, in the various camps, rather more highly trained specialists who could examine all cases that the officers, as the result of their experience in their efforts to train them, suspected of being defective or diseased.

We have not attempted in this paper to do more than give a general idea of what may be done.

THE INCIDENCE OF TUBERCULOSIS IN THE NAVY—A STUDY OF ADMISSIONS TO THE NAVAL HOSPITAL, LAS ANIMAS, COLO., 1916.

By G. H. BARBER, Medical Director, United States Navy.

In writing on the subject matter of this review only original admissions for the enlisted personnel of the service will be considered unless otherwise specified.

A subject of great concern to all having the best interests of the service at heart is that of the incidence of tuberculosis in its various forms for the service as a whole. A number of questions immediately present themselves for consideration: What conditions are present in the service that have apparently caused the high ratio of incidence of the disease in the past, as compared with the same ratio of foreign navies? Are the general sanitary conditions of our service of such a nature as to favor the infection of the personnel doing duty under service conditions? Is it possible that the cause of our high ratio of incidence is not to be ascribed to unfavorable sanitary conditions existing at our training stations and on board our ships? Assuming that the sanitary conditions at our training stations are as nearly ideal as service conditions render possible; that the sanitary conditions on board our ships are as nearly ideal as it is possible to render such artificial surroundings as are to be found on board every seagoing ship, what, then, are the factors that have contributed to the high ratio of this disease in our service?

The ratio of tuberculosis per thousand of force from 1895 to 1906, inclusive, was 5.0; from 1907 to 1913, inclusive, it was 5.12; for 1914 it was 4.39; for 1915, 3.71.

The total original admissions as with tuberculosis for 1916 was 167; the diagnoses of 11 of these cases were subsequently changed to nontubercular disease, leaving a total of 156 admissions of undoubted tuberculosis, or a ratio of 2.3 for 1916. While this ratio will not be the exact one appearing in the forthcoming Surgeon General's report, owing to the fact that a very few glandular and bone cases are not transferred here, it is approximately the true ratio for 1916. The Surgeon General's report for 1916 states: "The Naval Hospital, Las Animas, Colo., receives practically all of the cases of tuberculosis that develop within the Navy."

A comparison of the ratio of incidence of tuberculosis in our service with that of Germany and England shows as follows: For the five-year period to and including 1906, the ratio per thousand for the German Navy was 2.4; the English Navy, 3.2; the ratio for our service was 5.76. At that time the ratio per thousand of population as indicated by the death rate from this disease in the three countries named gave England first place in point of least prevalence, Germany second, and the United States showing the greatest prevalence. Notwithstanding this the ratio of tuberculosis per thousand for the German Navy was decidedly less than that for England. This result has been ascribed to the more exact methods of recruiting in force for the German service. That there has been a marked decrease in the incidence of the disease in our service seems to be well determined.

In a discussion of the causes of the incidence of tuberculosis in the service, two lines of thought suggest themselves and will be considered in the order mentioned: The personnel; the general sanitary environment existing at present under service conditions.

Tuberculosis has been defined as a universal disease of urbanized populations, infecting them early in childhood and producing death in about one-tenth of the population in whom resistance is lost from ascertainable causes, but unable to kill in the nine-tenths in whom resistance continues. This definition is at present accepted by most authorities as a fairly accurate presentation of tuberculosis as it affects society as a whole.

Presumably the accepted recruit had his origin from society's fortunate strata, whose individual members have developed sufficient resistance to have at least prevented the development of detectable evidences of an active manifestation of the disease. That the cause of the disease is still present in a latent form is quite probable in a large percentage of all individuals. In a given group of individuals great variation will be found to exist in the degree of resistance present. It seems to be perfectly true that nature is quietly but none the less persistently and effectively immunizing the human race against tuberculosis. From the above it may be inferred that our recruits will present all possible degrees of variation from the normal immunity to which such a large proportion of the human race owe their very existence. This variation is largely brought about through hereditary influences; syphilis and alcohol, and the debilitating influences of the acute infectious diseases and its trail is indelibly fixed in the physiognomy and general physical make-up of very many individuals who finally reach our hospitals and sanitoriums. This, in brief, is the source from which the service is recruited. One of the most important duties of the medical officers making physical examinations at our recruiting stations is to thoroughly familiarize themselves with the great variety of manifestations of physical inferiority presented in the persons of the enormous number of candidates for enlistment and appointment which pass through their hands annually. The first increment to our ratio of incidence of tuberculosis takes place at this stage in the history of the personnel. During the past year of our 156 admissions to the hospital 17 cases were admitted with the disease as "not in line of duty," 10.8 per cent of the total clinical symptoms of the disease having developed within six months from date of enlistment. It is quite probable that this does not represent the entire number of such cases for the service for the year, as there is an order in effect prohibiting the transfer here of such patients, provided they have a home to go to and are able to travel. The great majority of these cases developed at our training stations; they were all in their first enlistment. In view of the preceding remarks concerning some of the physical characteristics of our personnel, there can be little doubt that the infection in these cases existed in a latent form at time of enlistment. There were 10 other cases admitted in whom the disease developed within nine months from date of enlistment, they being, as well, in their first enlistment. They had passed the arbitrary limit of six months and were given the benefit of a doubt and admitted as "in the line of duty," and yet the disease manifested itself within three months of the beginning of actual duties on board ship, thus making a total of 17.3 per cent of the total admissions who developed the disease within nine months of date of enlistment—all serving in their first enlistment—and a total of 57 per cent who developed the disease during first enlistment. Evidence will be submitted later on in this review which, it is believed, will justify the conclusion that in these cases as well the disease existed in a latent form prior to enlistment.

In the Annual Report of the Surgeon General of the Navy for 1907 the following statement appears: "Until it is more fully realized that tuberculosis is a disease of nutrition, and until a minimum standard of physical requirement is more consistently exacted, we shall not have started in a fair way to materially reduce the tuberculosis in our service." A minimum standard of physical requirement has been determined upon, and this, with detailed instructions concerning what physical defects shall constitute cause for rejection, is on file in every recruiting office.

The wards of this hospital furnish abundant evidence, if such were needed, to show that these instructions are too frequently disregarded. There are comparatively few among the patients here serving on their first enlistment who from their general appearance show any evidence of having been in robust health at any time in the past. Degenerative stigmata, assymetries of form and development, spinal curvatures, hypertrophied tonsils and adenoids, nasal and palate deformities, under weight and height, stooping shoulders, and the usual familiar signs of poor general development are extremely common among the class of patients who have been in the service a year or less, and are strongly indicative, to say the least, of a physique likely to show little resistance to infectious diseases in general or to tuberculosis in particular. The fact is they are physical defectives, easily recognized by the careful observer, and under no circumstances should they have been accepted for any branch of the service.

An article by Passed Assistant Surgeon Charles J. Holeman, United States Navy, on "Stigmata of Tuberculosis," contains many interesting and convincing data obtained from a painstaking survey of the literature and careful observations made during his tour of duty at this hospital. The following table summarizes his observations on the rate of occurrence of the deformities and asymmetries referred to above and described by him as stigmata of degeneration:

	Whites.	Others.
Total examined	210	23
Total showing deformities of ears, palate, or face	169	19
Total showing deformities of ears	154	16
Percentage of deformed ears	73.3	69.6
Total showing deformities of palate	47	3
Percentage of deformed palates	22.4	13
Total showing facial assymetry	24	2
Percentage showing facial assymetry	11.4	8.7
Total showing combination of deformities	70	5
Percentage showing combination of deformities	33.3	21.7

This table is taken from The Medical Record, December 18, 1915.

He does not so state, but it is a fact that the presence of these stigmata are found almost exclusively among the class of patients serving their first enlistment; that these stigmata not only indicate a strong predisposition to the ravages of infectious influences, but their presence is strongly indicative of a high mortality. Of the patients in our hopeless ward, practically all show stigmata of the kind referred to above. He quotes fully from North American and foreign authors connected with tuberculosis sanatoriums, insane asylums, and institutions for the care of alcoholics. Of the significance of its bearing on tuberculosis he writes: "It does not appear fanciful that these manifestations of external physical imperfection should be accepted as indices of defective or at least poorly resistant viscera. On the contrary, it would seem most reasonable that if these stigmata (aplasias and developmental retardations) indicate a likelihood that mental instability may be present and eventuate in a psychosis should the individual find himself in an unfavorable environment they should also indicate that visceral aplasia or other defect resultant from embryopathy is present and may render such individual unduly susceptible to infectious influences, and therefore more likely to become tuberculous."

He concludes: 1. Stigmata of degeneration may be considered as stigmata of susceptibility to tuberculosis.

2. Extreme stigmata in tuberculosis indicate a less favorable prognosis.

3. Stigmata of degeneration, central nervous system and pulmonary (and probably other visceral) defects have a common blastophoric origin, alcohol ranking high.

I have quoted freely from this article for the reason that I believe its subject matter to have the utmost significance in its bearing on the origin of the first increment of our high ratio of tuberculosis in the service.

Of the 156 original admissions from the enlisted personnel for 1916, 45 were first-stage cases. Of these, 19 were from 10 to 36 pounds underweight at time of enlistment; 18 of this number were in their first enlistment. There were 50 second-stage cases. Of these, 22 were from 10 to 30 pounds underweight at enlistment; 15 of this number were in their first enlistment. There were 61 third-stage cases. Of these, 13 were from 10 to 29 pounds underweight at enlistment, and of this number 12 were in their first enlistment. I could find no record of a waiver ever having been requested for any of these cases. The Navy standards of height and weight are somewhat under those established by life insurance experience. That the subject of underweight is regarded by them as of serious import is confirmed by their published death rate for such individuals (Experience of Forty-three American Companies, from 1885 to 1908; number of policyholders, 530,108; Medico-Actuarial Mortality Investigation, vol. 11, p. 10). At ages 20 to 24, which is that of the majority of cases under consideration in this review, the death rate above the standard for persons 5 to 10 pounds underweight is 7 per cent; for 15 to 20 pounds underweight, 15 per cent; for 25 to 45 pounds underweight, 34 per cent.

The Navy standards for minors (as apprentice seamen) prescribed for ages 17 to 20 is 115 to 128 pounds and a minimum height of 62 to 64 inches. The instructions further state: "If the age is 6 months in excess of a full year, the requirements are those of the age at the next birthday" and that no underweight or underheight is allowed. The last admission for the year was that of a seaman, second class, who at enlistment, February 1, 1916, was 17 years 9 months of age, height 68¾ inches, weight 110 pounds. According to the service standard, his age should have been counted as 18 years; he would then have been 5 pounds underweight, but he was 4¾ inches overheight for that age. It is believed that such wide variations were not contemplated at the time of the adoption of this table for minors and that it should be modified by the addition of a mean height for weight requirement. Regardless of this boy's age, he was decidedly underweight for his height, was poorly developed, and presented marked stigmata of nervous system. (Cases of a similar nature not included in weight statistics of this review.) Further comment on the facts cited in this paragraph seems unnecessary; it is plainly corroboratory evidence and what one would expect to find existing in the class of physical defectives under consideration and referred to as the source of the first increment of our ratio of tuberculosis for the service.

It should not be inferred from the above that this condition is limited to the enlisted personnel. After four year's experience at this hospital the writer is of the opinion that the same factors are present for the officers of the service. There were 13 original admissions of officers for 1916. Counting service complement as 4,693, which includes midshipmen and warrant officers, this gives a ratio per 1,000 of 2.77, as compared with 2.3 for the enlisted personnel. Much the same physical characteristics are found to exist among this class of patients as noted among the enlisted personnel, only to a less degree.

In the course of the foregoing discussion an endeavor has been made to outline and define certain factors having largely to do with the maintenance of the high ratio of incidence of tuberculosis in our service. It will be noted that the causes thus far assigned bear almost no relation to service conditions. Theoretically the control and subsequent elimination of these factors rests almost entirely in the hands of the medical officers of the service. There remain for discussion the influences of the service sanitary environment. Do they, under the conditions specified at the beginning of this review, tend to favor the infection of the personnel doing duty under service conditions? The great majority of our recruits spend their first six months at one of the training stations. It is believed that the statement may be made without fear of contradiction that the sanitary surroundings of our training stations are as nearly ideal as it is possible to make them under service conditions. No doubt there are occasional instances when for a short time more recruits will be present than the buildings should accommodate and overcrowding will occur.

In the case of a majority of recruits the routine life led at one of these stations is much superior from a sanitary point of view to anything of the sort experienced by them prior to enlistment. Certainly it should not be possible for the recruit to contract tuberculosis while undergoing this period of training, and yet 10.8 per cent of all the admissions were from these stations or within a month from the date of transfer to a ship. There can remain no doubt but that the infection existed in latent form in all these cases at the time of enlistment.

The same favorable statement can not be made as regards the sanitary surroundings on board our ships. Even under the most careful and constant supervision overcrowding will occur; unfavorable weather conditions at sea will necessitate the unshipping of a number of the exposed ventilators and the shutting down of blowers, thus leaving a part or parts of the living quarters below almost entirely without ventilation of any sort. There are frequent occasions when for considerable periods a large proportion of the entire ship's company has almost no opportunity to exercise in the open air. There are many who, from the nature of their duties, never have occasion to go on deck, excepting as they leave the ship for liberty ashore. These and many other well-known artificial conditions of living tend to handicap efforts to establish healthful living conditions on board our ships. They constitute and are always spoken of as the normal service conditions.

Notwithstanding the existence of this long list of unnatural conditions surrounding life on board ship, it is a fact that the great majority of our continuous-service men spend the greater part of their service on board these same ships, and aside from injuries or minor ailments, are finally discharged or retired, as the case may be, after from 8 to 30 years' service in excellent physical condition. When one of these men is admitted to the sick list with tuberculosis it can almost certainly be traced to a broken resistance caused by a severe or prolonged attack of one of the acute diseases, alcohol or syphilis, with the subsequent outbreak of a latent tuberculosis focus, or a fresh infection from the discharges of a tuberculous shipmate, or from a tuberculous focus on shore. There were 67 admissions to this hospital during 1916 from this class of men, 42.9 per cent of the total admissions; the remainder of the admissions were from the class of men described in the first paragraphs of this review, and all serving in their first enlistment, and a majority of them in their first year of service. The following table is introduced here merely to show the distribution of the disease among the members of the various branches of the service. As I have no knowledge of the total number in the various branches, comparative percentages can not be given.

SEAMAN BRANCH.

Master at arms, first class	1
Chief boatswain's mate	1
Boatswain's mate, first class	1
Boatswain's mate, second class	2
Chief gunner's mate	1
Gunner's mate, first class	2
Gunner's mate, second class	1
Gunner's mate, third class	2
Chief quartermaster	2
Quartermaster, second class	1
Quartermaster, third class	1
Seaman	19
Ordinary seaman (seaman, second class)	16
Apprentice seaman	6
Total	56

ARTIFICER BRANCH.

Chief machinist's mate	2
Machinist's mate, first class	2
Machinist's mate, second class	1
Chief electrician	3
Electrician, second class	3
Chief water tender	1
Water tender	2
Coppersmith	1
Plumber and fitter	1
Oiler	5
Fireman, first class	13
Fireman, second class	5
Coal passer (fireman, third class)	6
Total	45

SPECIAL BRANCH.

Ship's cook, first class	1
Chief yeoman	1
Yeoman, first class	5
Yeoman, third class	1
Landsman for yeoman	3
Chief commissary steward	1
Ship's cook, second class	3
Ship's cook, third class	1
Baker, second class	2
Hospital apprentice, first class	8
Hospital apprentice	3
Total	29

MESSMAN BRANCH.

Steerage steward	1
Warrant officer's steward	1
Mess attendant, first class	1
Mess attendant, second class	5
Mess attendant, third class	1
Total	9

MARINE CORPS.

Sergeant	2
Corporal	5
Private	20
Trumpeter	1
Total	28

In view of the recorded facts concerning the general physical characteristics of this class of patients, one should have small cause for surprise that they should so early in their career succumb to the disease in the course of the performance of their arduous duties under the influences of the admittedly unfavorable environment of life aboard ship. Aside from being the main factor in the first increment to our high ratio of incidence of tuberculosis, this class of recruits becomes the second increment to this ratio by virtue of the incessant associations incident to living conditions to be found on board every ship in the service.

The further consideration of this phase of our subject involves a discussion of the great importance of the early diagnosis of the disease and prompt transfer to a hospital of all cases presenting the characteristic clinical symptoms of tuberculosis.

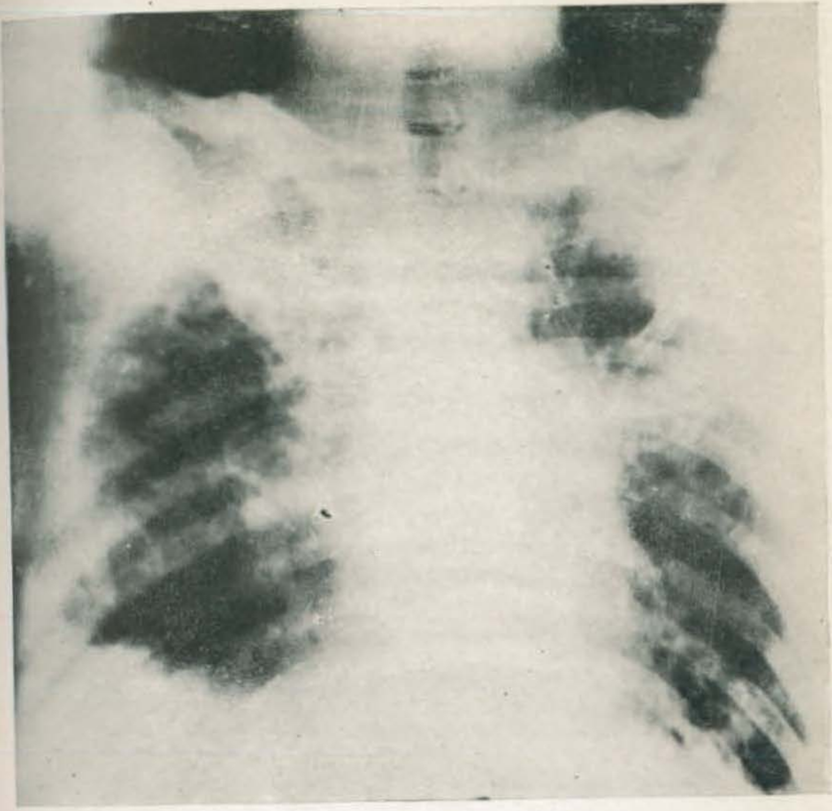
It is believed to be conceded by all that the presence on board ship of one or more carriers of this disease constitutes a real danger from infection to other members of the ship's company. The avenues through which the infection may be spread are well known to all and need no mention. The records of this hospital are replete with case histories indicating that a considerable number of medical officers do not concede the possibility of making a diagnosis of these cases from the clinical history and physical signs. The remarks which follow may appear elementary and trite in the extreme, but I have no apologies to offer. The experience of the past 12 months furnishes the most positive reasons for their repetition at this time.

Pulmonary tuberculosis is essentially a chronic disease, often manifesting itself intermittently. The manifestations of its onset are generally overlooked or appear in the health records as "diagnosis undetermined" or "influenza." The acute symptoms subside in the course of a week or 10 days and the patient is discharged to duty, perhaps without a suspicion having been aroused as to the nature of the trouble. The next entry in the health record of these cases is likely to be of a small hemorrhage, or the history of general malaise, gradual loss of weight, perhaps a few night sweats, a persistent dry cough. Close questioning will elicit the fact that the cough has been going on for several months. Too often the health records chronicle the treatment of these patients for protracted periods on a duty status with "Brown mixture" or some other simple cough sedative.

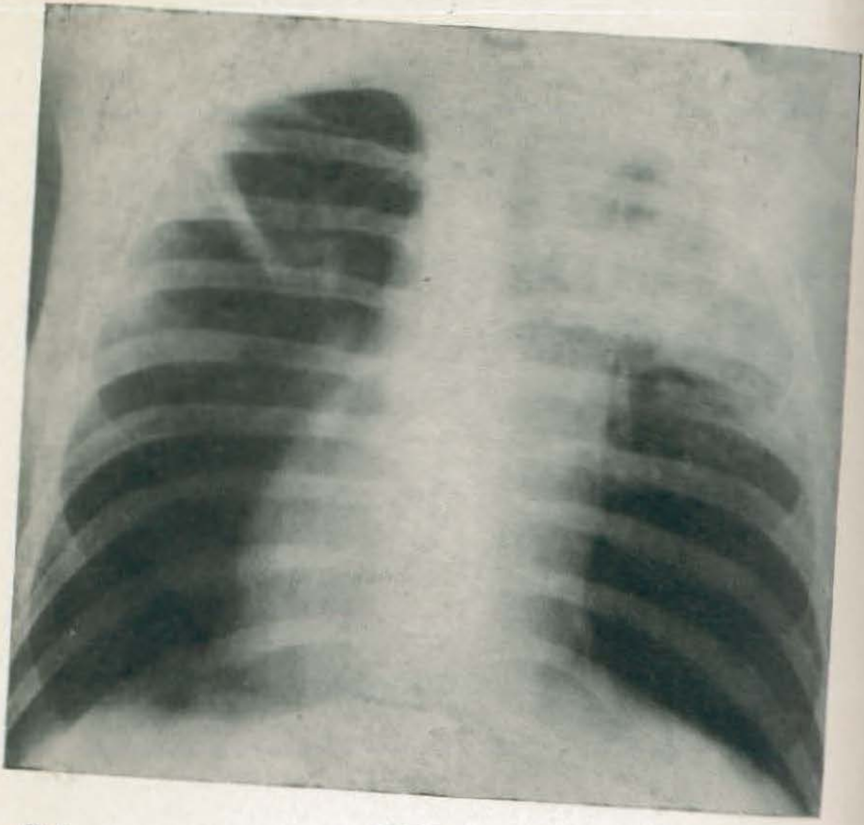
It is believed to be of the greatest importance that the medical officer should realize the possibility of diagnosis in these early stages. The skill required for the early diagnosis may be said to be difficult and laborious to acquire and, further, that no short cut to it does or ever can exist. It is commonly remarked that it is impossible to make a physical examination and arrive at definite conclusions as to the probable diagnosis in chest cases on board a modern man-of-war on account of the noise and tumult which is almost incessantly present. While there is a considerable element of truth in this contention, it is believed to be possible to make such an examination somewhere, at some hour of the day, and to arrive at the conclusion that the patient reciting the chain of symptoms enumerated above, should be transferred to the hospital ship or a hospital as soon as circumstances would permit. There, at least, conditions exist which permit a thorough and complete examination of the case and the prompt determination of the presence or absence of an active tuberculous process and, what is of paramount importance in the interest of the patient and the service, an early transfer to this hospital of all cases in whom such active process is found to exist, the disease being "in line of duty;" otherwise, an early discharge from the service.

If one may form definite conclusions from the entries made in the health records, the principal obstacle standing in the way of an early diagnosis and transfer of these cases is the absence of tubercle bacilli in their sputum. In this connection it is to be noted that clinical forms of pulmonary tuberculosis occur in which tubercle bacilli can be found in the sputum only after prolonged search of numerous slides prepared by one of the enrichment processes, or not at all; furthermore, that a form of tuberculosis virus exists which is not demonstrable by the Ziehl method of staining and, finally, the extreme unreliability of an expressed opinion to the effect that tubercle bacilli were absent as the result of the average examination of specimens taken on board ship or elsewhere, for that matter. Matson, at the conclusion of his research, in the Von Musser Klinik, Vienna, published the following conclusions: "Tubercle bacilli may be present in quantities of 50,000 per c. c., and they are not easily demonstrable on smear preparations, much less so on cover-glass preparations, when a smaller quantity is examined. This does not seem unusual, inasmuch as smears covering two-thirds of a slide and examined with a Reichert one-twelfth oil-immersion lens, aperture 1.30, tube length 140, gave a film area 125 fields wide and 250 long, or 31,250 fields per slide. Using one-fortieth c. c. for each smear we could expect to have on the entire slide about 1,000 bacteria distributed over 31,250 fields. Assuming the distribution to have been equal, we would have 1 bacillus in every 31 fields. The average examiner often examines less and pronounces the specimen negative; since the distribution is never equal one may examine 300 fields and find nothing. By direct methods of staining sputum containing 55,000 bacilli per mil, they could not be demonstrated; even at 550,000 bacilli per mil only scattering bacilli were found." It would appear, then, that one is not justified in pronouncing a specimen of sputum negative for tubercle bacilli from an examination by direct smears; it is necessary that the specimen should be prepared by one of the enrichment processes, a method certainly not practicable on board ship.

I have quoted the above author thus fully in order to emphasize more sharply the well-established opinion that the appearance of tubercle bacilli in the sputum is not an early sign of pulmonary tuberculosis; on the contrary, it is positive evidence of a breaking down of tissues, and in a considerable proportion of cases this does not take place until a considerable area of one or both lungs has become involved. The failure to arrive at a correct diagnosis of this disease prior to the appearance of tubercle bacilli in the sputum, in a considerable proportion of all cases, must now be regarded as a reflection on one's diagnostic ability.



CASE 1.



299-2

CASE 2.

Extracts from the health records of two cases, with X-ray reproductions from plates taken on admission to this hospital, are introduced here to illustrate points dwelt on in this review on diagnosis. They have not been selected as "horrible examples"; on the contrary, they are examples of the case records of patients who are being constantly received at this hospital as second and third stage cases which, during 1916, were 71 per cent of the total admissions.

Case I.—*C. G. (Ch. G. M.), U. S. S. ———, April 20, 1916.*—Diagnosis undetermined, in line of duty; incident to nearly 25 years' service. Patient has been under observation for the past 7 or 8 months on account of his general appearance and the complaints of his shipmates in C. P. O. quarters, that he coughed so much at night they were unable to sleep. Patient states that he has not lost weight so far as he knows; no night sweats nor evening rise of temperature. Repeated examinations of chest and sputum have been negative, and condition is apparently a rhinitis and pharyngitis of chronic nature * * *. On account of the small area of the C. P. O. quarters and the effect his presence has on his shipmates, his presence on board in his present condition is thought inadvisable, and he is transferred to hospital. At the hospital April 22, 1916, submucous resection was performed; was under treatment for this condition until May 31, 1916, when the presence of tubercle bacilli in great numbers was demonstrated in the sputum and diagnosis changed same date to tuberculosis, chronic, pulmonary. Survey was called at once and he was admitted to this hospital June 17, 1916. Physical signs then showed moderate to heavy infiltration of almost the entire right lung; moderate to heavy infiltration of upper lobe and a part of lower lobe of left lung. Had lost 25 pounds in the past three months. The photograph of this plate illustrates well the physical findings revealed on admission here. This case also had a concurrent infection of syphilis. The patient did badly, and died December 29, 1916.

Case II.—*J. F. B. (Seaman), U. S. S. ———, October 17, 1916.*—Diagnosis undetermined; origin undetermined. He was first seen by the writer this morning. Pulmonary tuberculosis suspected. Transferred to hospital. U. S. Naval Hospital ———. Diagnosis undetermined. Origin duty; infectious influences. Patient states persistent slight cough for some time with occasional blood-streaked sputum and loss of 15 pounds weight. Occasional chills, fever and night sweats during the summer; some pain in the left lung. Examination shows high pitched respiration generally over right lung and upper lobe of left lung. October 17, urine shows heavy cloud albumin, many casts. Roentgenogram: General infiltration of lower lobe left lung and entire right lung, especially middle lobe.

October 19, T. B. in sputum. Diagnosis changed to tuberculosis, chronic, pulmonary. He was admitted to this hospital November 3, 1916. He stated that he had been in good health until April, 1916, then had a bad cold with cough, which had persisted to the present. Chills and fever off and on during the summer. This patient was attending one of the service schools and did not attend sick call for fear he would be placed on the sick list, but was prescribed for by persons in the sick bay; took Brown mixture and other cough mixtures during the entire summer. The photograph of plate taken on admission shows well the amount of lung involved. Sputum on admission was loaded with tubercle bacilli. Patient is doing well.

CONCLUSIONS.

1. That but a relatively small proportion of tuberculosis occurring in the service can be ascribed to unfavorable sanitary conditions of our service environment.

2. That a large proportion of the total number of admissions to this hospital shows the presence of physical defects, which were present at time of enlistment, and therefore these cases should never have been enlisted.

3. That tubercle bacilli in the sputum do not constitute an early sign of tuberculosis; the statement of their presence on a report of medical survey is not looked for or requisite for its approval by the Bureau of Medicine and Surgery.

4. That the classification on admission at Las Animas during 1916 of 71 per cent of second and third stage cases is not a creditable showing for the Medical Corps under service conditions.

5. That the detention on board ship for protracted periods of suspected cases of tuberculosis, pending the demonstration of tubercle bacilli in their sputum, is reasonably certain to result in the infection of other members of the ship's company and should be discontinued

ETXRACT FROM ANNUAL SANITARY REPORT, NAVAL HOSPITAL, LAS ANIMAS, COLO., 1916.

Patients.—Total admissions calendar year 1916.

[All entries in hospital register.]

TUBERCULAR.

Navy and Marine Corps officers, active list, original admissions	13
Navy and Marine Corps officers, active list, readmissions	6
Naval auxiliary officers, original admissions	1
Naval auxiliary officers, readmissions	3
Navy and Marine Corps officers, supernumerary, original admissions	1
Navy and Marine Corps officers, supernumerary, readmissions	4
Ex-officers readmitted	3
Enlisted men, Navy and Marine Corps, original admissions	167

Enlisted men, readmissions (change of diagnosis, etc.)	16
Enlisted men, supernumerary, original (no previous entry)	8
Enlisted men, supernumerary (previous admission here)	67
Naval auxiliary enlisted men	3
Civilian readmissions	1

NONTUBERCULAR.

Naval officers, active list, original	4
Enlisted men, Navy and Marine Corps	19
Naval auxiliary enlisted men	2
Supernumerary	2
Civilians	2
	322
Remaining from last year	224
Total of all cases treated during 1916	546

RÉSUMÉ OF ACTIVITY OF HOSPITAL AS COMPARED WITH PREVIOUS YEAR.

Remaining from 1915	176
Remaining from 1914	189
Cases continued to 1917, all causes	192
Cases continued to 1916, all causes	176
Discharges from hospital, 1916	211
Discharges from hospital, 1915	228
Sick days from all causes, 1916	68,158
Sick days from all causes, 1915	70,820

This résumé does not include supernumerary statistics.

Thirteen officers of the active list of the Navy were admitted to this hospital during the current year, from other hospitals and stations; of these, 7 or 0.149 per cent were graduates of the Naval Academy; 3 or 0.0639 per cent were warrant officers; 3 or 0.0639 per cent were appointed from civil life. The total number of officers so admitted (13) was 0.277 per cent of the active list of the Navy, as of January 1, 1916. Ratio of incidence among officers, 2.77 per 1,000.

There were 46 deaths during the year, distributed as follows: 2 retired officers (ex-officers); 1 civilian; 2 enlisted men, Naval Auxiliary Service; 25 Navy and Marine Corps, active, enlisted; 16 supernumeraries, ex-enlisted men.

Of the supernumeraries, 3 were admitted from the town of Las Animas, 1 died before he reached the hospital, 1 died of suppurative appendicitis, and 1 died 15 days after admission. Four of the remainder died after less than one month's residence.

Of the Navy and Marine Corps, active, enlisted, 6 were of cases admitted during 1915; 7 of the entire number died two months or less after admission.

Of the 167 original admissions, Navy and Marine Corps, 139 were from the Navy and 28 from the Marine Corps. Of the 167 cases there were 55 first-stage cases, 50 second-stage cases, and 62 third-stage cases.

Of the 167 original admissions for tuberculosis, 17, or 10.7 per cent, were not in the line of duty; 22 cases, or 13 per cent, were complicated by a concurrent syphilitic infection.

Of the 167 original admissions, 11 cases were determined to be nontubercular; 5 of these were discharged to duty; 2 cases had diagnosis changed to syphilis, were retained for treatment, and will be discharged to duty in the near future; 1 case had diagnosis changed to arthritis chronic and was transferred to a general hospital for further treatment; 1 case was discharged from the service as he was underweight and height, poorly developed. There were 2 cases of unresolved lobar pneumonia in which almost complete absorption of the exudate has taken place, and they are in excellent physical condition. A board of medical survey has recommended their transfer to a general hospital for a short period of observation and ultimate discharge to duty.

During the past year the routine treatment employed has been a continuation of the methods reported for 1915. Reference to the statistical table appended, marked "A," shows in a measure the results attained; comparison with a similar one for 1915 gives a more favorable showing for the results of the past year. There is a relatively small class of cases to be found among all stages of admissions, greater, of course, in second and third stage cases, who beyond some slight improvement in their general physical condition, do not show the slightest tendency to develop a sufficient resistance to arrest the activity of the disease under any method of treatment thus far attempted. Many of these cases are complicated with syphilis; others have the combined histories of syphilis and alcohol and a mixed infection. The technic of Dr. Ellis Nonime, of New York, has been recently brought to our attention and highly recommended from many sources as a method of reaching this class of cases. The essentials of the method consist in the use of tuberculin in sufficiently high dilutions, in doses so small as to cause little or no reaction. About 45 cases have been selected from all classes, and have been under treatment from two to six weeks. This is, of course, too short a time to permit writing of results from any method of treatment; however, a considerable number of these cases that had been from 3 to 12 months without showing the slightest evidence of improvement, now show unmistakable signs of a change for the better. This is encouraging, to say the least, and the method will be continued and the number of cases so treated increased if results seem to justify the course.

The distribution of the patients on January 8, 1917, was as follows:

Mens' infirmary, 54 patients: in north wing, 14 (these being most recent admissions who remain there in bed for two weeks regardless of their condition); in center wing, 12 (these cases are more or less hopeless); in south wing, 15; in surgical ward, 13 (5 of the latter are surgical cases, and the remainder are the overflow to the convalescent wards). There is one officer in the officers' infirmary.

The remainder of the patients are in convalescent wards and are about the grounds daily taking some prescribed form of exercise in accordance with views advocated by Dr. Patterson in his work on "Graded Rest and Labor."

Statistical summary of treatment, 1916.

	Classification.							
	Incipients.		Moderately advanced.		Far advanced.		Totals by divisions.	
Remaining from last year	67		93		64		224	
Original admissions, 1916	63		53		77		193	
Readmissions, 1916	6		3		22		31	
Discharged, 1916	76		71		72		219	
Continued to 1917	59		80		90		229	
	Number.	Days.	Number.	Days.	Number.	Days.	Number.	Days.
Dead	[1] 2	596	11	4,341	31	5,532	44	10,469
Unimproved	11	4,510	24	10,426	24	6,014	59	20,950
Improved	18	9,086	11	4,983	14	5,226	43	19,295
Quiescent	17	6,585	10	5,419	1	255	28	12,259
Apparently arrested	6	1,747	7	4,373	......	....	13	6,120
Arrested	9	3,999	7	3,924	1	460	17	8,383
Apparently cured	3	3,076	1	811	......	....	4	3,887
Diagnosis changed to nontubercular disease	10	799	......	....	1	231	11	1,030
Continued to 1917	59	20,834	80	33,208	90	28,177	229	82,219
Totals for above	135	51,232	151	67,485	162	45,895	448	164,612

[1] One case massive hemorrhage and one case apoplexy.

Total sick days of cases continued to 1917	82,219
Total sick days of cases discharged during 1916	82,393

Review of treatment and results for the years from 1911 to 1916, inclusive.

Year.	Admissions.	Discharges.	Continued to the following year.	Average number of sick days for each discharge.	Average number of sick days for each case continued.	Deaths.	Average number of sick days per death.	Total number of sick days for all cases, both discharged and continued to the following year.
1911	215	212	146	244.6	284.7	33	246.0	93,674
1912	182	190	142	252.6	310.8	26	194.0	92,132
1913	225	159	208	312.0	235.7	22	236.8	103,156
1914	244	221	231	264.1	305.5	43	191.1	128,946
1915	200	207	224	370.3	325.5	36	259.4	149,812
1916	224	219	229	376.2	359.0	44	288.0	164,612

Laboratory report for 1916.

Character of examinations:	
Sputum	1,833
Urine	567
Feces	108
Ascaris lumbricoides	18
Strongyloides intestinalis	7
Uncinaria duodenalis	7
Tubercle bacillus	15
Taenia saginata	2
Fatty acid crystals	1
Occult blood	3
Trichiura trichiuris	2
Entameba histolytica	1
Blood counts, differential	1,053
Blood counts, red	1,042
Blood counts, white	1,069
Hemoglobin estimations	1,638
Blood, Arneth counts	1,046
Sera, Emery and Noguchi	367
Sera, Emery and Noguchi, positive	60
Blood, malaria	90
Sera sent to Washington (Naval Medical School) for diagnosis	21
Gastric contents	19
Specimens, miscellaneous	5
Milk analyses, cow	1
Milk analyses, human	1
Milk, dairy, tested for butter fat	3
Cream, dairy, tested for butter fat	4
Water analyses	4
Gasoline analyses	1
Specimens imbedded and sectioned	3
Preparation:	
Autogenous vaccine, human	24
Autogenous vaccine, other	1
Found or isolated:	
Fatty degeneration in liver	1
Vincent's spirillum bacillus in throat	1
Tubercle bacillus in spinal fluid	1
Tubercle bacillus in testicle	1
Tubercle bacillus in urine	2
Tubercle bacillus in pleural fluid	1
Tubercle bacillus in scrotum	1
Klebs-Löffler bacillus in throat	6
Bacillus coli communis	2
Staphylococcus in tonsillitis	1
Diplococcus in tonsillitis	2
Mixed infection, staph. and dipl., tonsillitis	2
Mixed infection, staph. and dipl., ear	1
Hog kidney	1
Tests and inoculations:	
Rabbits, inoculated	1
Alcohol, identity of	2
Widal tests	1
Milk for formaldehyde	1
Special:	
Microphotographs made	169
Lantern slides from X-ray plates	74

STUDIES OF DRUG ADDICTS.

By W. A. BLOEDORN, Passed Assistant Surgeon, United States Navy.

The problem of handling the great army of drug addicts which exists in this country and of preventing further recruits from joining this army, is one which is receiving much attention at present. Medical men, social workers, psychologists and legislators have devoted much time and study to the question and it is evident that we are becoming aroused to the need for an effective means to check and eventually stamp out this evil. That new drug addicts are constantly being added to this already large army of noneffectives, there is abundant evidence to prove. In spite of stringent laws governing the distribution of habit-forming drugs, in spite of every effort made by the civil authorities to enforce these laws, the fact remains that these drugs can still be procured with possibly the only difference that for the drug addict, the cost, like that of the other necessities of life, has advanced many hundred per cent. There is also evidence tending to show that this increase in the number of drug habitués is not altogether a passive affair, but that there is active recruiting going on; in other words, that persons interested in the sale of drugs to addicts are not averse to increasing the demand by enlisting recruits. It is evident from an examination of drug addicts that an appreciable number acquired the habit in this manner.

There appears to be a well organized traffic in habit-forming drugs in spite of the severe penalites which the law imposes upon persons so engaged and it is also apparent that the profits from such an enterprise are correspondingly great. At the present time the usual price paid for one-eighth ounce of heroin when purchased upon the streets from drug venders is $7, and as heroin admits of easy adulteration with sugar of milk it is not unusual for the addict to receive his purchase made up to the usual bulk with 50 per cent sugar of milk. He is almost entirely at the mercy of the seller and must take what is handed him for his money without question or parley. As a rule he does not know the source of supply and is usually left waiting on the street while the seller goes around the corner and procures the desired amount. If he attempts to follow he gets nothing and also loses the money advanced. Notwithstanding every effort made to prevent this illegal traffic, habit-forming drugs are easily obtained particularly in large centers of population and the drug addict will usually state that as long as he could produce the price, he had no difficulty in purchasing the desired drug. The fact remains that habit-forming drugs are still readily available and this fact in itself tends to perpetuate drug addiction. As long as these drugs can be obtained easily, there will continue to be a steady stream of new addicts and it is believed that one of the first steps to be taken should be the elimination of this availability of habit-forming drugs. The most stringent laws which legislators have been able to enact have failed in this respect.

There is probably no subject in literature about which more theories have been evolved, more explanations offered and more fantastic fiction written, than that of drug addiction. Much time, effort and money have been expended toward curing the addict after the habit has become fixed and comparatively little toward the elimination of the conditions which were directly responsible for the habit. There are numerous excellent institutions throughout the country where drug addicts are received, treated and cured, and it is a comparatively easy process in such an institution to get the patient to the stage where he is taking no more drugs. We are devoting our energies to the treatment of a condition and have not taken the time to inquire sufficiently into the etiology. It is believed that this attitude toward the drug evil is responsible in great measure for the steady line of recruits who fill the places of those who drop out and swell the ranks of this already large army. It is unfortunate that the term "cured" has come to be applied to cases in which the drug habit has been suspended for a period of weeks or months. There is no more justification for considering such a case as cured than there is for considering a case of tuberculosis cured in which the active tubercular process has become quiescent but in which the tubercle bacilli are still viable and ready to begin again their destructive work at the first opportunity.

It is a psychological fact that a habit once firmly established over a number of years can not be uprooted and thrown aside by treatment covering a period of weeks or months. It has become engrafted upon the individual and constitutes a part of his very being. His resistance for this act has been broken down, and it is not only easy but it is the natural thing to happen that he should go back to this habit upon the slightest provocation. In examining any considerable number of drug addicts one is impressed by the large number who have at some previous period of their addiction taken the cure and gone back to their old habit immediately upon discharge, or, after a period of months, or even years, have lapsed for various reasons. The fact remains that drug addiction once firmly established leaves the individual in a precarious position throughout the remainder of his life as far as the liability of returning to the use of drugs is concerned. If we could follow these cases upon discharge, and smooth out all the difficulties, real and imaginary, which arise in their path, we might succeed in keeping many of them from returning to their old habits. Very frequently in examining these cases we find that after discharge from an institution all went well for some time until the patient encountered heavy weather. He loses his position, some increased demand is made upon him by his family or his employer, or some project that he had counted on turns out badly. He feels himself unequal to facing the situation squarely and finds solace and relief by a return to the drug which, while it dulls the keen edge of disappointment and sorrow and serves as a curtain which he may draw between himself and the hard realities of life, at the same time saps his mental and physical energies and leaves him eventually adrift, abandoned by relatives and friends, a human derelict.

That some of these cases upon discharge from institutions do not return to the use of drugs there is no doubt. This is particularly true of those who are in a position to change their environment, and thus avoid old associates and haunts where they are confronted with conditions which led to their former addiction. In going into the history of many addicts who have taken one or more cures previously and remained off the drug for various intervals, we find the great majority of them have returned to the use of drugs through association with former companions who are addicts and who offer them the drug and encourage its use. It seems to be a general rule at this stage of the addict's career, when he is particularly susceptible to a slight weight thrown in the balance, that the drug always seems readily available, and is even offered to him without cost. As long as he shows a tendency to leave it alone his former companions seem free and eager to offer it, but as soon as the desire for the drug begins to reassert itself then their attitude changes and he must pay the price in order to secure the drug.

In inquiring into the subject of drug addiction it was considered that the best source of information was a study of the addict himself, particularly of the personality, the mental and physical makeup, the environment and the conditions under which the drug was sold. It is an easy matter for the theorist, in the seclusion of his study, to advance long-distance hypotheses which fit the subject in hand but when we examine these cases at close range we find that many of these explanations do not explain.

The public is still inclined to regard these cases as a group of mental, moral and physical defectives, who through some inherent weakness have been predestined to fall by the wayside and who if not actual criminals are potential criminals. They are described as lacking in all the virtues and possessing innumerable vices and as being constant offenders against the law. In fact the law itself stamps them as criminals for it provides penal servitude for anyone having the drug in his possession unlawfully and naturally the addict has it in his possession daily. This provision of the law while appearing excellent at first glance acts at times as a boomerang. The following case in point will serve to illustrate: A young man who had been using drugs and to whom the cost was becoming prohibitive decided he would like to enter an institution and be cured of his habit. Not knowing the usual procedure to gain admittance and having heard that the police could send him to such an instutition, he went to a policeman, told him he was a drug user and would like to take the cure, at the same time giving him his last bottle of "dope." He was thereupon charged with having drugs in his possession unlawfully and given an indefinite sentence of from one to three years in the penitentiary. It is believed that this attitude of the law toward the addict is productive of much harm.

A vast majority of these cases take the drug merely because they see their associates taking it and are invited to participate and not for the relief of pain, suffering, illness, or misfortune. There can be no doubt that association with the drug and with people who use the drug is directly responsible for many of the recruits. This is borne out by the large number of physicians, nurses, pharmacists, and dealers who are known to be drug users.

The average individual has a certain horror of the drug habit and instinctively recoils from any suggestion of using drugs himself. But constant association with habit-forming drugs and with companions who use them has a tendency to overcome this feeling, particularly during the more susceptible period of youth. Again, the method of enlisting new recruits has been developed along the lines of overcoming this instinctive dread of taking drugs. If we hand the average individual a hypodermic syringe and ask him to take the drug in this manner, the chances are that he will refuse point blank. But when he is offered a little powder and advised to sniff it up his nostrils (and heroin lends itself admirably to this procedure) he is not so apt to recoil, as this method of administration appears quite harmless and is less apt to rouse his fear of the consequences. This appears to be the method of taking drugs most freqently adopted at first. Later, when the habit becomes confirmed, the addict resorts to the needle in order to get a better and more lasting effect and to eliminate waste and conserve his supply of the drug, the expense of which has become a serious problem for him.

An examination of these cases at close range does not bear out the statement often made that drug addicts belong to the so-called criminal class. It is true that when the drug has come to be a necessity for the addict the importance of obtaining enough of it every day overshadows everything else in his life, and in order to obtain the drug he has little hesitancy in lying or stealing. These traits are developed and become engrafted in the direct proportion that they become necessary to secure the desired relief and are not the result of inherent criminal tendencies. In other words, the individual is not an addict because he has criminal tendencies but rather he develops criminal tendencies because he is an addict.

The number of individuals who begin the use of drugs through illness, insomnia, or persistent pain, while constituting a large aggregate, is believed to form a relatively small percentage of the total. The great majority take their first step through being unfortunate enough to meet and associate with addicts. The recruit is often invited to participate in the use of the drug, and these associates seem never loath to provide him with this means of becoming a confirmed habitué. This is particularly true of the large centers of population, and there can be no doubt that overcrowding, congestion, insanitary surroundings, and a lack of the facilities for healthful recreation are predisposing factors in drug addiction. Under these circumstances a drug addict becomes a focus of infection, as it were, and through contact with susceptible individuals serves to spread the evil. With this sort of environment the drug habit is considered to be highly contagious, particularly among minors.

The efforts made toward the correction of the drug evil have been directed in great measure to the cure of the habit after it has become firmly established, and our attention has been fixed upon the final scene in the drama, to the exclusion of the series of events which led up to the climax of confirmed drug addiction. We are constantly discharging from our hospitals, sanitariums, and public institutions drug addicts who have been advanced to the stage where they are taking no more drugs and at the same time admitting a steady stream of recruits, repeaters, and backsliders who fill the places of those discharged and serve to keep the total from decreasing. This endless procession passes before our eyes, occupies our center of vision for a short time and disappears. We busy ourselves with them while they are under our care, we make strenuous efforts to free them from their addiction and then we pass them along to shift for themselves. The period of their lives prior to admission, when their habit was in the process of being formed, is passed unobserved and following discharge, in a great majority of instances, they pass out of our field o vision. In this day and age, when preventive medicine has come to overshadow all other aspects of the healing art, we would do well to inquire into the conditions which lead up to drug addiction, the predisposing factors, and the means, if any, which may be used to counteract these influences.

There is a tendency to surround drug addicts with an air of mystery, to regard them as a peculiar class, to ascribe to them numerous vices and few virtues and to set them apart from their fellow men as being a distinct type. But when we attempt to describe this type we find that we are describing an individual and not a class. There is no justification for the mystery which has been allowed to creep in and hover about the drug addict. It is easy to dispose of these cases by consigning them to the so-called criminal class, or the class of defectives, but when we come to examine them individually and at close range we find increasing numbers who do not fit into these special classes. The term "moral delinquent" has come to be applied to the drug addict and while there is justification for this term it really is only a synonym of drug addict and does not serve to throw any considerable light on the class as a whole. Instead of attempting to relegate these individuals to any particular class, we have attempted to describe certain attributes which appear to belong to a great majority of the group. The manner in which the habit began, the circumstances leading up to drug addiction, the age, the effect of the drug and the mental attitude of the beginner all show a striking similarity.

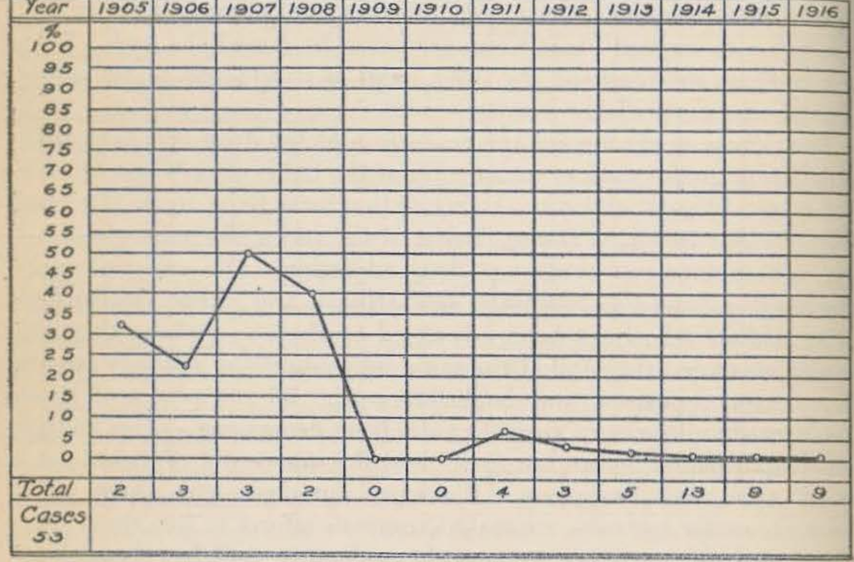


CHART No. 1.—Cocain.

The drug that will be used by the great majority of drug addicts will be the one most readily obtainable and at the present time this drug happens to be heroin. Through the kindness and courtesy of Dr. Menas S. Gregory, of Bellevue Hospital, we have been able to examine many addicts admitted to the hospital and also to classify the records of admission for drug addiction from 1905 to 1916, inclusive. They have been divided into four classes according to the drug used and the percentage of admission for each drug forms the basis of comparison. The records for this 12-year period include 2,759 admissions for drug addiction.

Chart No. 1 shows the percentage of admissions for cocain. From 1905 to 1908 cocain addicts constituted from 23 to 50 per cent of admissions. From 1909 to 1916 they constituted only from 1 to 3 per cent of the total number admitted.

Chart No. 2 shows the percentage of admissions for opium addiction, and shows a low admission rate particularly during the past four years, the admission rate for 1916 being only 1 per cent.

Chart No. 3 shows the percentage of admissions for morphin addiction. We see that admissions for morphin constituted a large percentage of the total number, the highest point being reached during 1913, when morphin addicts constituted 98 per cent of the total number admitted for drug addiction. From 1913 to 1916 there was a steady, constant drop in the admission rate to 1916, when the lowest point in the 12-year period was reached. During 1916 morphin addicts formed 17 per cent of the total number admitted.

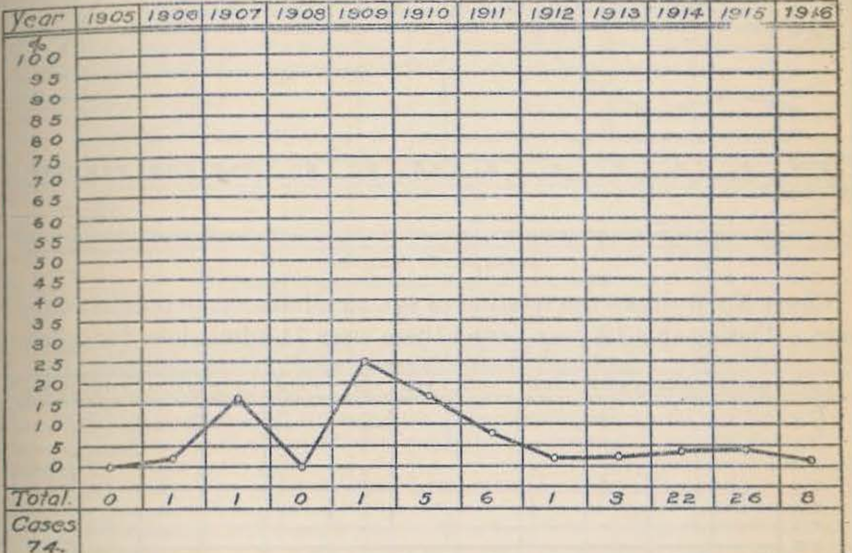


CHART No. 2.—Opium.

Chart No. 4 shows the percentage of admissions for heroin addiction. The first admission was in 1910, and from this time on the number of admissions shows a constant rise up to 1916. From 1913, when heroin addicts constituted 5 per cent of the total admissions, we see a startling rise in the percentage curve up to 1916, when heroin addicts formed 81 per cent of the total number admitted. This upward rise in the heroin curve is in marked contrast to the steady decline in the admission rate for morphin addiction.

Chart No. 5 shows the relation of age on admission to cocain addiction. During this 12-year period there were 53 admissions for the cocain habit. The highest point reached on this chart is between the ages of 27 and 30, which comprise 34 per cent of the total admissions

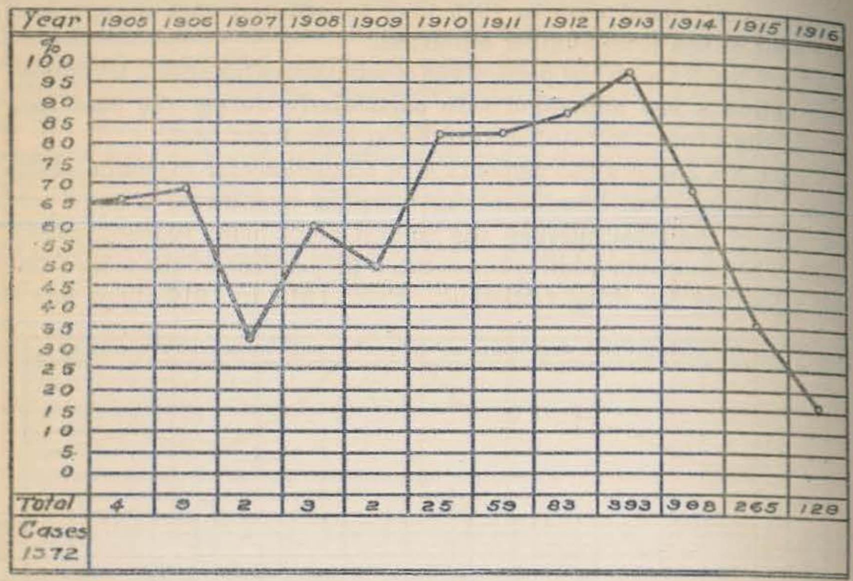


Chart No. 3.—Morphin.

Chart No. 6 shows the relation of age on admission to opium addiction. During this 12-year period there were 74 admissions for opium

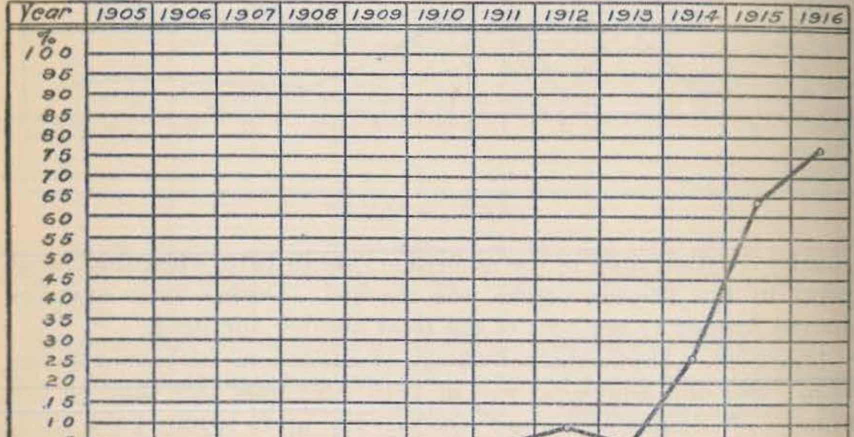


Chart No. 4.—Heroin.

addiction. The highest point reached on this chart is between the ages of 36 and 40, which comprise 23 per cent of the total number admitted.

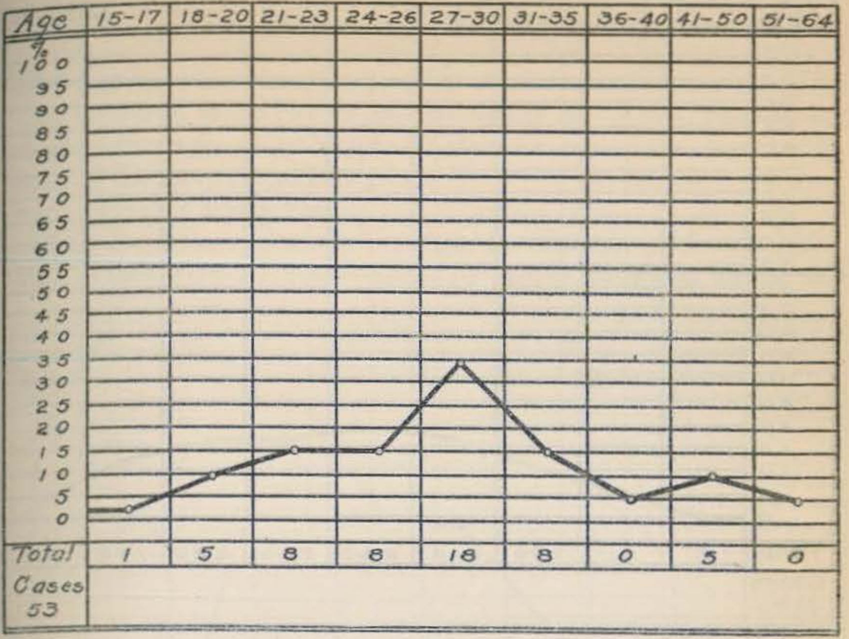


CHART No. 5.—Relation of age to cocain addiction.

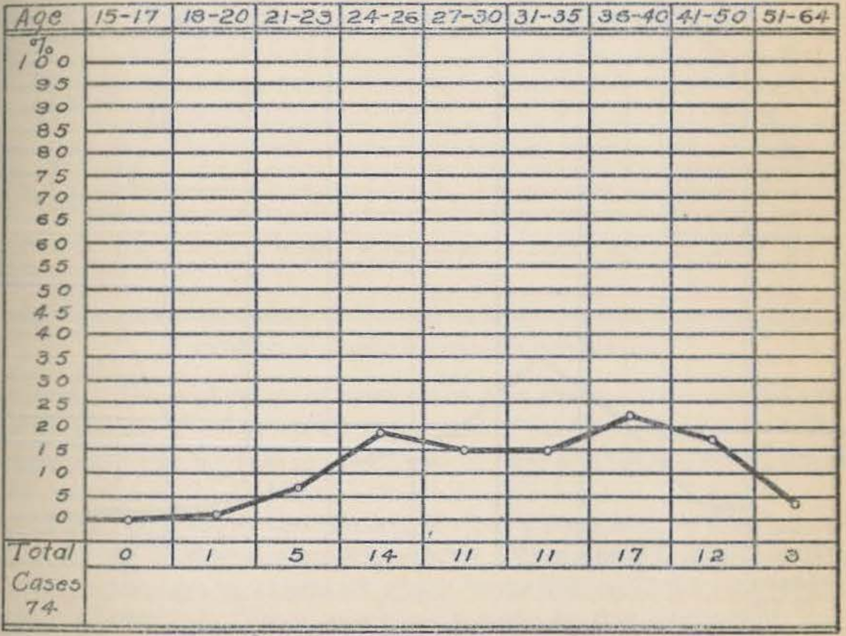


CHART No. 6.—Relation of age to opium addiction.

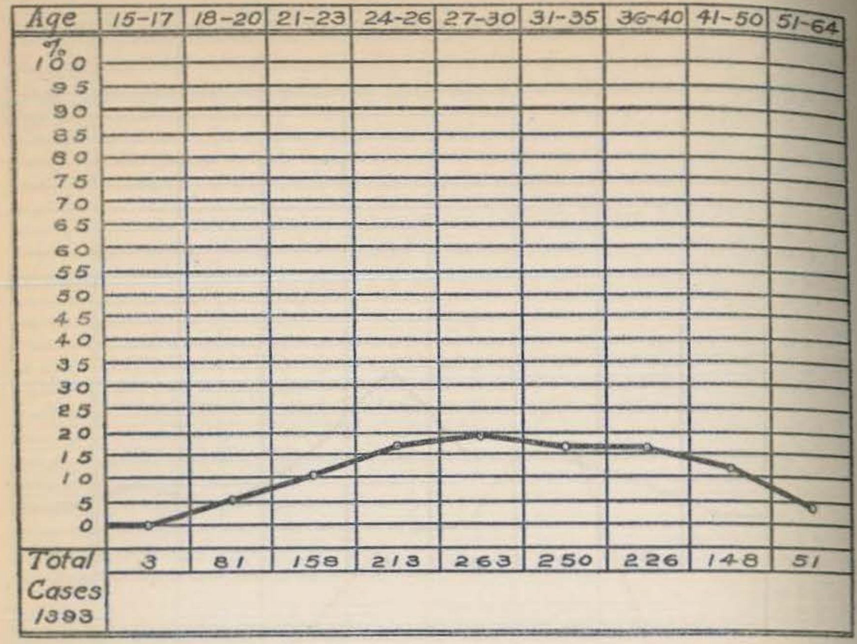


CHART No. 7.—Relation of age to morphin addiction.

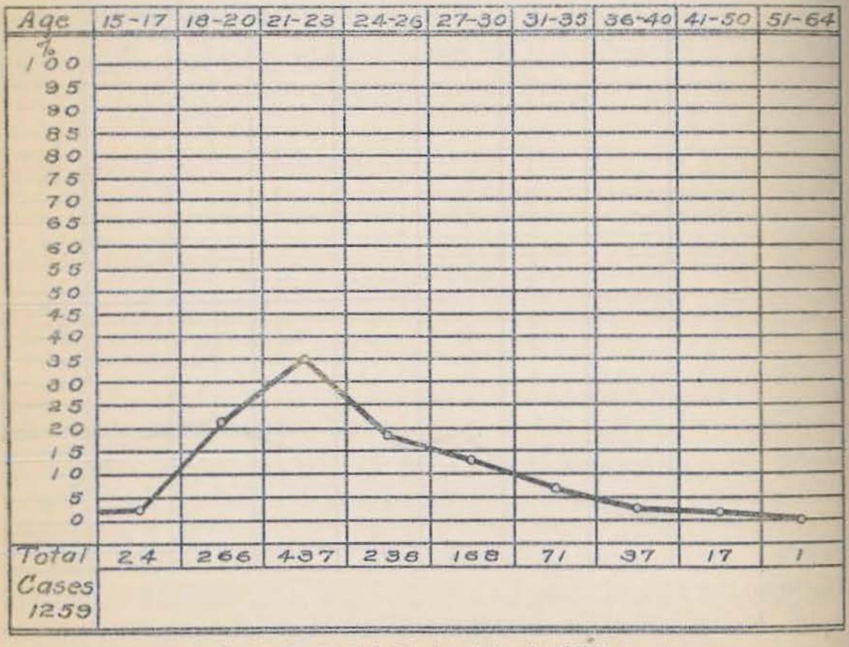


CHART No. 8.—Relation of age to heroin addiction.

Chart No. 7 shows the relation of age on admission to morphin addiction. There were 1,393 admissions for morphin addiction during this period. The highest point reached here is between the ages of 27 and 30, which form 19 per cent of the total admissions. This chart shows no sharp rise for any particular age period, but the age on admission appears to be greater than for any of the other drugs. Many of the morphin addicts give a history of having taken the drug over a period of many years.

Chart No. 8 shows the relation of age on admission to heroin addiction. There were 1,259 admissions for heroin addiction during this period. The highest point reached on this chart is between the ages of 21 and 23, which comprise 35 per cent of the total admissions. The second highest point is for the 18 to 20 year age period, which forms 21 per cent of the total.

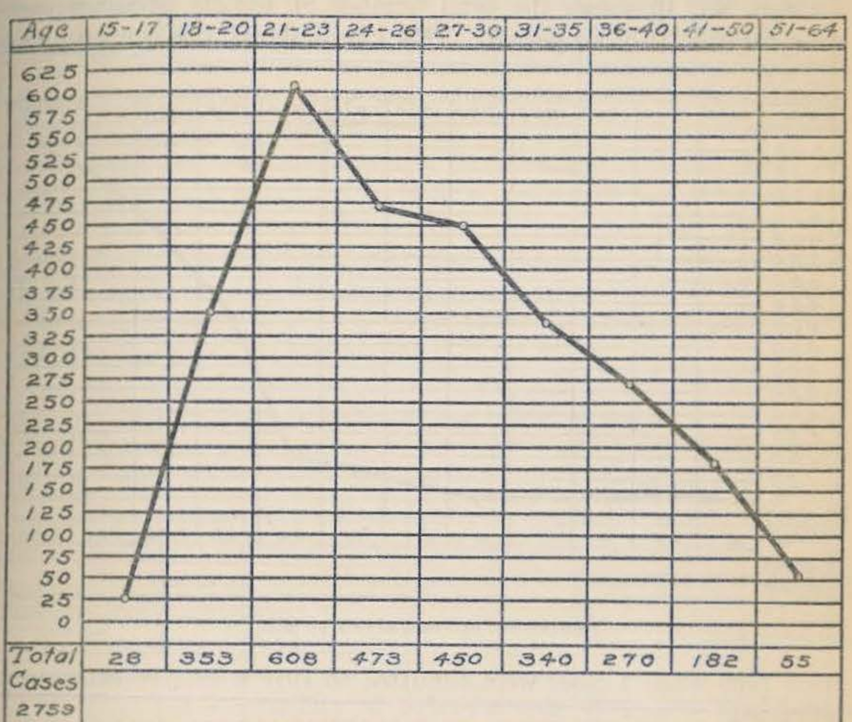


CHART No. 9.—Relation of age to addiction for all drugs.

Chart No. 9 shows the relation of age on admission to drug addiction for all drugs considered together. The highest point is reached between the ages of 21 and 23, which forms 608, or 22 per cent, of the total admissions. The curve rises rapidly to this age period, and from this point shows a steady, constant decline with advancing age. When we take into consideration the fact that most addicts have been constant users of the drug for at least a year and in many cases for several years before admission to the hospital, we see that a large percentage began the use of drugs while they were still minors. This fact appears significant and is worthy of consideration in our efforts at eradicating this evil. That a large percentage of individuals begin the use of drugs in early adult life, or while they are still minors, must be admitted. This is an age particularly susceptible to outside influences and during which the individual is not inclined to consider seriously the consequences of an apparently simple act, such as taking a "sniff," "a jab," or "smoking a pipe."

Chart No. 10 shows the total number of addicts admitted each year for the 12-year period. This curve shows the constant rise from 1909 when 4 cases were admitted to 1916 when 796 cases were admitted.

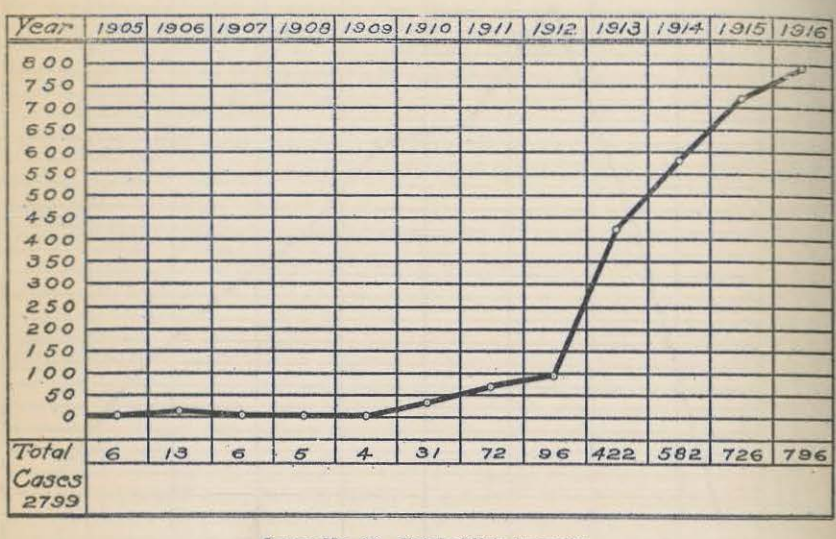


CHART No. 10.—Total addicts, by years.

The mental effect of the drug appears to be somewhat exhilarating at first, but the addict will usually state that after a few months, particularly with heroin, this effect is not obtained and he merely takes the drug to ward off the discomfort and uneasiness which result when going without it. It is believed that the impersonation on the stage of drug addicts who are represented as having all sorts of pleasant sensations, visions and delightful experiences while not only being at variance with the facts in the case, has a dangerous suggestive influence on susceptible individuals.

It is also evident that many individuals resort to the use of drugs to submerge mental conflicts which arise and that this means of escape is gladly welcomed. While under the soothing influence of his drug, the addict is enabled to ignore for the time being his lack of adjustment to his environment. It is apparent that the cure of this class of addicts rests on the adjustment of these mental conflicts. In fact, it is becoming more and more evident that the solution of the drug evil does not depend upon the administration of any particular specific or cure. The underlying causes, of which drug addiction may be merely a symptom, must be investigated and removed. We are wasting much energy in putting such a patient through an elaborate system of treatment which, while it removes the drug from him for the time being, makes no effort at readjustment of the patient to his environment and fails to take into consideration the basic underlying causes of which drug addiction is an expression.

The Wassermann test was performed in all cases examined and showed approximately 20 per cent of positive results when taken as a routine part of the examination.

The Binet test was also a part of the examination in all cases and while the series is not yet completed it is evident that drug addicts can not be classed as mental defectives. While, naturally, some were found who fell below the 15-year test at least 80 per cent answered all tests applied and showed no evidence of being mentally backward.

As a result of our studies of drug addicts it appears that we may arrive at the following conclusions:

(1) That there is a well-organized traffic in habit-forming drugs and that new drug addicts are constantly being recruited.

(2) That heroin is the drug which lends itself particularly to this sort of traffic and that the menace of heroin is growing.

(3) That a large percentage of addicts begin the use of drugs in early adult life or while they are still minors.

(4) That the drug addict has a tendency to spread the evil and is a menace to his associates.

(5) That drug addicts can not be placed in the class with mental defectives.

(6) That the availability of habit-forming drugs constitutes one of the chief reasons for their use.

(7) That the solution of the drug evil does not rest on the administration of any specific or cure, but rather on the removal of the underlying causes of which drug addiction is merely an expression.

(8) That these causes vary in individual cases and that each case requires individual attention and treatment.

It is believed that the following recommendations will help in the general campaign against drug addiction:

(1) The correction of predisposing causes as far as possible, such as overcrowding, insanitary surroundings, the lack of the facilities for healthful recreation and the prevention of contact with drug addicts.

(2) The after care of drug addicts following discharge from hos-

pital is considered highly advisable. A prolonged change of environment, country life, or a change of residence to avoid old associates would help to decrease the number who return to the use of drugs following discharge from hospital.

(3) Facilities for building up these cases physically before throwing them on their own resources would be desirable, as many are physically unable to secure employment immediately following discharge.

(4) Government control of all habit-forming drugs, including the manufacture, distribution, sale and importation of all such drugs is recommended.

It is believed that these procedures would decrease the availability of these drugs, which availability serves to perpetuate drug addiction.

A PLEA FOR GREATER CARE IN THE PERFORMANCE OF DUTY BY MEDICAL OFFICERS AT RECRUITING STATIONS.

By A. FARENHOLT, Medical Inspector, United States Navy.

Among the necessarily multifarious duties with which a naval medical officer must acquaint himself, that of the examination of applicants for enlistment in the Navy and Marine Corps requires and should receive the same diligence and attention which is to be expected in the pursuance of the more strictly professional lines of work. Should it be possible in the selection of recruits to obtain absolutely perfect physical material, the amount of damage as expressed by sick days, by ineffective personnel, and by subsequent pensions, and this latter aspect is of the utmost importance, would be cut down very materially. On the other hand, should vigilance in this matter be relaxed, the results would be obviously reversed and the value of costly armaments, of ability and of skill and courage materially lessened. Napoleon's last levy of troops, after his return from Elba and during the "hundred days" campaign, was composed of young boys and unsuitable material left from former levies; their value was far below that of his former troops and in disgust he himself once said: "They serve only to line the roadside and to fill the hospitals." In selecting the general type from which the most suitable material may be obtained, the conditions to be encountered at sea in times of war and peace, and all the details of ship routine, barrack life, expeditionary service, quarters, food, etc., must necessarily be known and appreciated; in other words, a suitable tool for the work intended can be expected to give better results in the long run than an unsuitable one.

A physically perfect giant of 6 feet 6 would be a desirable addition for the Life Guards, but not for the crew of a ship, where he would be an endless source of worry to the executive officer and to the paymaster. It is a well-known fact that during the early months of the

Civil War the regiments recruited from among the tall, husky Maine lumbermen could not stand the vicissitudes of Army life as well as those recruited in the larger cities and composed of men of lighter build, more uncertain and irregular habits and more active mentality. The same is not so pertinent from the Navy standpoint, especially in time of peace, and undoubtedly a more "flexible" personnel would be obtained by a blending of both types. Distinctions are apt to be invidious, but personally, contrasting the city and the country boy, I am rather inclined to favor the latter, bearing in mind his all around desirability for health, reliability, and general efficiency.

The medical examiner must necessarily familiarize himself with the information on this subject contained in the Manual for the Medical Department, United States Navy. This presents at length and in detail directions and instructions to be observed, has the force of law and accepted custom, and must be regarded as both authority and guide. These notes therefore are intended only as an expression of personal preference in methods of routine examination and to present certain observations and suggestions.

In all recruiting places a certain amount of thinning out of applicants is done by the nonmedical petty officers or noncommissioned officers, as the case may be, before they reach the medical officer. Men obviously unfit and presenting gross disqualifications are turned away at once. When an applicant reaches the sick bay, or other place of examination, he should be directed to fill out a printed form giving his name in full, place and date of birth, and such other data as may be considered necessary. With some recruits there is difficulty in obtaining the correct spelling of the name, and probably the best result is obtained by requiring the candidate to write it himself. This and the necessary conversation during the examination will give a very fair impression of his educational qualifications. The medical officer should bear in mind that Instructions 3202, United States Navy Regulations, state, "no person other than a medical officer shall be permitted to conduct any part of a physical examination or to sign an original entry on any medical record of enlistment." This needs no comment; while well-trained assistants can very materially assist, they can not relieve the surgeon of his responsibilities.

Before the clothing is removed the vision and the color examination should be completed. Under the best conditions of light a man with normal eyesight and not over 30 years of age should be able to read the letters or numbers on the Snellin test card from 25/20 to 30/20. The test can not be considered a hard one, and although 15/20 is permitted in the case of an otherwise acceptable candidate, full normal eyesight should usually be required and one whose vision falls below 20/20 looked upon with disfavor, especially so in the case of younger men and those who will be called upon for signal and gunpointer duty; the latter are required, by order, to read 20/15 with the aiming eye. Pronounced myopia or hypermetropia disqualifies. A large percentage of eye trouble as seen under service conditions results from this latter defect. The examiner will encounter color blindness in only about 2½ per cent of applicants, and unless some care is given a case may slip through. If the chromatic sense is decidedly feeble, the man should be marked as a rejection. Many cases of color blindness will be found to have originated among those whose duties have required them to look into bright fires, as in the instance of coal passers, firemen, smelter workmen and mill operatives; less frequently it is temporarily caused by the glare of sunlight on snow.

The candidate having completely stripped, he is weighed, and the height and thoracic measurements are taken and compared with the official scale, which it is well to have worked out to quarter inches, and posted in a convenient place. Full standard measurements must be demanded for the engineering branch, especially for the ratings of fireman and blacksmith. In enlisting minors especial care should be taken, as many surveys and pensions result from too superficial scrutiny at the time of examination of this highly important class. Full standard requirements and freedom from constitutional taint or tendencies should be required and only carefully considered waivers asked for. Applicants for the rate of bandsman will often be found physically defective and to require leniency and frequently a waiver. The same may be said, although in a lesser degree, for stewards, cooks and mess attendants. The fact that men frequently apply for and obtain changes of ratings, quite commonly from the seaman branch to that of fireman, third class, should, however, make the examiner cautious in taking chances and cause him to remember that, regardless of the rate for which examined, all hands may be called upon to perform the heaviest kind of work. The measurements having been taken, the candidate is required to stand before the medical officer in some suitable place. I find it convenient to designate this spot by a painted mark, brass plate, or outlined foot pattern, and it materially facilitates the examination.

The features, physique, stamina, bearing, and general desirability are now observed and a rapid comprehensive glance taken to detect any glaring or prominent disqualifications. Disease of the skin and rashes should be looked for, all of which cause rejection in a recruit. A mild eczema, or pityriasis, for example, both of which are rather common among the seafaring population, might be ignored on reenlistment, but if extensive should call for a waiver. Psoriasis used to be seen quite commonly at sea but is not so frequently seen now. Rashes, especially of syphilis, will occasionally be seen. Abnormal paleness, coloring or dryness of the skin, jaundice, cyanosis, evidence of frost bite, poor circulation, operation scars, wounds, varicose veins, choreic movements, spasm, tremor, mouth breathing, abnormal voice, sweating, trembling and coughing should be looked for during this superficial inspection.

Commencing the more personal part of the examination the surgeon should feel the scalp and inquire if the applicant has had any injury whatever of the head, ascertain if scars are adherent to the bony parts below and if there is any depression in the calvarium. Inquiry should be made as to whether any injury of importance ever resulted in confinement in bed or in hospital. It is well to test the hearing in two ways—by closing one ear and requiring the candidate with closed eyes, to repeat words or numbers whispered by the examiner and by the watch test. Applicants vary markedly as to response to either the voice or mechanical test and, both being so easy to carry out, the double test leaves the examiner with a far better idea of the auditory condition than if only one is employed. Of the two the voice test is by far the more reliable. The applicant should be asked if he has "ever had any running from the ears or earache." The speculum is introduced and the drum and the canal observed. The Manual requires that the medical officer should "satisfy himself of the patency of the eustachian tube and the integrity of the tympanic membranes."

The eyes are next carefully looked at, the tension of the ball felt, the lids everted, and the examiner convinced of the absence of disease. The nose should be inspected, the freedom of the air passages demonstrated and deflected septum, polypi, inflammation, and ozena excluded. With the mouth opened and with the aid of the wooden tongue depressor, the lips, teeth, palate, tongue, fauces, tonsils and pharynx are observed. The requirements concerning teeth are lenient and must not be infringed. It may be noted here that, as a class, bakers are quite apt to have carious teeth. Very large and ragged tonsils are disqualifying. During this scrutiny of the face the surgeon has a fair opportunity to consider the question of incipient insanity, degeneracy and mental sufficiency, and it is a very important one indeed. Discharges on account of mental defects have during certain years ranked high. The symmetry of the face, shape of ears, level of eyes, presence of iridoplegia and inequality of the pupils should be noted in this connection. The neck is to be inspected for scars, contractions, pulsation and thyroid affections.

The thorax presents an important field. The surgeon should note its symmetry, respiratory movements, position of apex beat, fullness of interspaces, evidence of bilateral increase in circumference (barrel shape), or pigeon breast (*pictus carnatum*), or rachitis and position of shoulders and scapulæ, also, as a distinguishing characteristic when present, the angular eminence between the manubrium and body of the sternum known as the "angle of Ludwig" and abnormalities of the xiphoid.

The heart must be auscultated at the apex, base and lower end of the sternum. The slightest abnormal sound should be studied, and, if proved to be innocent, and the candidate accepted, it is carefully noted on the health record. Exercise such as running will often clear up a doubt or unmask serious valvular trouble. During certain years by far the greatest number of discharges for disability occurring within four months of the date of enlistment have been on account of heart disease.

The average examiner will find that he can obtain more information concerning the lungs by auscultation than by percussion and that usually the former method will suffice. Klemperer says, "clear, soft, vesicular breathing without râles is a positive sign that the auscultated area of the lung is healthy." Both apices, the axillæ, the lowest point in the axillary lines (fluid) and in the back the parts normally covered by the scapulæ are the routine areas of importance. The surgeon must be prepared to find normally somewhat harsher breathing over the right supra and infra clavicular regions than over corresponding parts of the left side. While thickness of the chest walls and imperfect breathing may cause pulmonary sounds to be heard with somewhat varying intensity, any sound not distinctly normal must be looked upon with grave suspicion. The great damage done by tuberculosis in general and tuberculosis of the lungs in particular must be borne in mind; the importance, therefore, of accepting no candidate who shows the slightest infection, or one who could easily become infected, is of the utmost importance and beyond argument. For many years the deaths from tuberculosis in the Navy have ranked within the first five causes and frequently within the first two.

On account of the many organs situated within the abdominal cavity and the lengthy and difficult procedures necessary for the complete examination of each, this space must present, from the recruiting point of view, the most unsatisfactory field which we have to explore and it is fortunate that among the material which presents itself, young men averaging about 21 years of age, there is a comparatively small amount of disease of these organs which, even if sought for at length, would be detected or considered disqualifying. The surgeon should, however, pay considerable attention to this region. The appearance, distention, retraction (scaphoid) and pendulous or thin walls noted, tympanites or ascites determined, the entire area palpated, and tender points, especially over the appendicular region, and tumors felt for. If there are indications for it the vertical thickness of the liver between the axillary and mammillary lines should be determined, the size of the spleen roughly made out, or the urine tested for albumin and sugar. The applicant should be asked if he has at any time had disease of the abdominal organs or genito-urinary tract. The conditions of both inguinal canals must be determined in the usual way and actual hernia, patency, presence of impulse, incarceration of testes, disease of the cord or other abnormalities determined. The size and character of both testes, scrotal cords and their accompanying structures should be appreciated by feel. The applicant should be directed to demonstrate the fact that he is free from venereal disease, malformations, hemorrhoids and adjacent disqualifications. Elongation and tightness of the prepuce, while not a cause for rejection, should count against a candidate and he should be urged to submit to circumcision after enlistment.

The thighs, legs, and feet are to be inspected, the shins especially for healed or open ulcers, the ankles and feet for edema; ingrowing nails, hammertoes, sweating of feet looked for, the popliteal space and back of legs searched for varicose veins, both superficial and deep, and the condition of the knee jerks tried if there is suspicion of nervous disease or insanity. With the applicant facing in the reverse direction the soles of both feet are to be raised and inspected and extensive callus, fissures and possibly flatfoot considered. Should the arch of the foot appear to be low, measurements ought to be taken to determine the relation of the tubercle of the scaphoid to the malleolar-metatarsal line. Foot weakness and broken arches may also be determined by observing the degree of eversion of the feet, the adduction of the anterior parts, or the appearance of these characteristics, of flattening out, when the entire weight is thrown upon one foot. This defect has in the past caused a greater amount of damage in the Marine Corps than in the Navy and during the past year stood second only to tuberculosis as a cause for discharge by survey.

The examiner should assure himself of the integrity of the bony apparatus and of the articulations. With the applicant facing him he should ask if any bones have "ever been broken," or any dislocations or severe accidents suffered. If so the parts receive a more careful scrutiny. With the hands and arms extended to the front the examiner may inspect the palms, fingers and thumbs with attention to the usefulness of the hand, observe old scars, amputations, stiff joints, wounds or other peculiarities, feel the radial pulse and determine the condition of the arterial walls and approximate blood pressure. Such physical movements as the examiner may see fit to employ should be made and copied by the applicant in order to detect possible disqualifications. The relative level of the hips and shoulders and the mobility of the spine determined in all directions and kyphosis (gibbosity), lordosis, scoliosis and painful points excluded. The glandular apparatus, chiefly cervical, inguinal, and epitrochlear should be felt.

The routine examination is not completed until the applicant has been asked: (1) If he has at any time been addicted to a drug habit. (2) If there is any insanity in his family. (3) If he knows of any physical disqualification. (4) If he has had syphilis, fits, tuberculosis (and if a minor, enuresis). (5) Data concerning former diseases required for the health record. Men presenting recent and satisfactory discharges and applying for reenlistment in the same branch are particularly desirable and valuable from all points of view and the medical officer must be prepared to overlook in this class of men defects or peculiarities which on first enlistment should cause rejection. In a majority of cases these questionable conditions are either incident to service life and often have originated in line of duty, in which case the service is obligated to the man, or the defect had existed throughout the previous enlistment and caused little or no trouble. Questions of hearing, teeth, eyesight, glasses (it is very seldom advisable to accept for first enlistment an applicant who is compelled to wear glasses), patulous rings, discrepancies of height and weight, low arches, etc., must be leniently dealt with and graver defects submitted to the bureau for waiver. Men who have been discharged *several years previously* and men *changing* from Army to Navy or Marine Corps are somewhat less desirable.

While it might seem that an examination conducted in this manner would entail the expenditure of a considerable amount of time and patience, it does not necessarily do so unless some especial defect is observed which requires additional scrutiny and deliberation. After the vision, color sense, weight and measurements have been taken, and the applicant has stripped, such examination can be made in about five minutes which certainly can not be considered excessive.

While obviously it is better to conduct these personal investigations in the presence of as few men as possible, when several are to be examined it is better if the next man in turn is "standing by" and observes the method of procedure used in the case of his predecessor, as in this way the work will be finished more quickly and satisfactorily.

It is not advisable to permit the applicant to hear the surgeon's comments or descriptions in regard to defects which might later, by exaggeration, be used to obtain a medical discharge. The instructions issued concerning the making of the personal description and marks are full and explicit and admit of no misunderstanding. The examiner should bear in mind that this description must be such as to render the identification of the man positive under any conditions and beyond question. Identification frequently becomes necessary in the case of bodies found after death by drowning, or following railroad or other mutilating accidents when only the prominent and ineradicable characteristics may be relied upon. The height should be taken with scrupulous care. The characteristics of the hair, eyes, and complexion are easily recorded and the teeth checked off accurately on the chart. The description of scars, moles, warts, birthmarks, etc., is elementary but important. Tattooing is to be described and letters printed legibly. Hirsuteness or the reverse should be noted and as many identification marks as possible recorded.

It is obviously of importance that a note should be made of any condition, not of sufficient importance to disqualify, which might possibly in the future lead to a pensionable state. The question of "prior to enlistment," or the reverse, becomes harder to determine as time passes and a careless oversight on the part of the recruiting surgeon might inflict upon the Government long-continued payment on an unjust and unnecessary claim.

It is doubtful if the Binet-Simon and allied tests can be made a routine procedure in the examining room by any except an officer who has made this branch his especial field. If a doubt as to mentality exists after the play of questions regarding family history, education, former occupations and diseases, that doubt for practical purposes should constitute a cause for rejection.

The importance of and method of conducting the finger print record is not detailed here.

In closing allow me to repeat: The examiner should regard his duties most seriously, should strive to develop a nicer sense of observation, remembering that a compromise with established physical standards can only result disastrously, and he should adopt for the examining room the motto: "Quality, not quantity."

A FURTHER STUDY OF MENTAL TESTS IN THE EXAMINATION OF RECRUITS.[1]

By A. R. Schier, Acting Assistant Surgeon, United States Navy.

The following observations, based on the mental examination of applicants for enlistment at this station, are submitted as a sequel to previous reports.

All men qualifying physically for enlistment have been examined by means of a series of 10 mental tests, previously described in the United States Naval Medical Bulletin. With a view of learning which method would best provide a practical standard or minimum requirement to exclude the majority of service undesirables with the least possible loss of men who might later prove reasonably efficient the results of these examinations were marked in accordance with the following methods:

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[1] See United States Naval Medical Bulletin Vol. IX,

(*a*) Number method, by which each successfully passed test has a value of one in the final score, and not less than seven successes are required for a passing mark.

(*b*) Point method, by which success on a test or part thereof is scored by points, the number based on the relative difficulty of each test. The total number of points possible for the series is 100. According to the number of points scored men are classified into safe (A and B), doubtful (C), and mentally deficient (D) groups.

As service undesirables are classed men who for various reasons prove unfit and undesirable, frequently becoming court-martial offenders, inmates of disciplinary barracks, prisons, and at times hospitals for the insane, and thereby cause much trouble and expense. They may be roughly divided into four classes, viz:

(*a*) Those who are ignorant and stupid due to a lack of or defective school training.

(*b*) The feeble-minded, who do not and can not get on as a normal person should because of an arrested or imperfect cerebral development. Such men lack judgment, will power, and comprehension of an individual's relation to his environment and are therefore not capable of getting on in the service. They are usually not recognized as mental weaklings until some delinquency brings them to the attention of those in authority.

(*c*) Men who, through vicious training, have acquired pernicious ideals, in consequence of which they have an improper conception of patriotism, show disrespect for all authority and are indifferent to the sanctity of the oath which they have taken. Many of these individuals are intelligent and readily assent to general propositions concerning right and wrong. The application of discipline and restraint in the service being in conflict with their ideals, they find it impossible to fit in aright and either desert or are always in trouble.

(*d*) Those who develop definite psychoses and are therefore not responsible for their actions and behavior.

This classification is rather an arbitrary one. The dividing line between the various classes is not sharply defined, and they merge more or less into each other. To state with any degree of accuracy the number falling in each is not possible. Most of those in the first class are not above the level of the feeble-minded. A careful estimate has shown that about 35 per cent of the so-called failures, the drifting, floating men, who are on the job to-day and off to-morrow, who quit work on the slightest excuse, never becoming skilled and faithful workers and are frequently in conflict with law and order are ignorant and have attended school less than three years. Of the inmates of the civil reformatories and prisons 16 per cent never attended school, 6 per cent less than one year and 9 per cent spent less than two years at school, showing that there is a very intimate relation between delinquency and ignorance. The diagnosis of feeble-mindedness, which after all is a relative mental state, depends on the standard by which the individual is judged. This being true, then those who, because of ignorance and stupidity, are incapable of reacting rightly to their surroundings in the service may be classed from a service standpoint as "service morons," or better perhaps, as "mental substandards."

The mental tests used in these examinations were devised for the purpose of detecting those undesirables who come in the first and second class. An extended experience with them has shown that the majority of those belonging to these types can be detected and could be excluded from the service if a uniform mental standard for enlistment were adopted. Men in the third and fourth class pass most or all of the tests in the series and their elimination can not be brought about by any brief mental examination in the recruiting station.

In addition to those previously reported, 140 applicants have been given the tests. Of this number 133 were accepted and transferred to the recruit depot. Seven were rejected here, both as a result of the tests and for other reasons of undesirability. The scores made by those examined (140), marked by both methods, are shown in Table 1.

Those failing by both methods are shown in detail in Table 2.

Reference to Table 2, and especially to the subsequent and previous histories of those failing, will show that the majority were for various reasons undesirable men for the service. Grouped under causes of undesirability they were as follows:

	Number method.	Point method.
Mental defectives, Nos. 16, 18, 22, 25, 26	5	5
Deserters:		
Nos. 4, 5	2	......
Nos. 6, 7	......	4
Undesirables, Nos. 8, 9, 10, 17, 21, 23, 24, 27	8	8
Below average intelligence, Nos. 19, 20	2	2
Total	17	19
Per cent	77.2	70.3

According to the point-method classification those coming in group C have been considered doubtful because some proved fairly efficient after entering the service, while others were found undesirable. As will be noted, 7 (46.6 per cent) of the 15 in this group were found undesirable, and it is therefore classed among the failures or substandards.

A practical mental standard and the one sought should eliminate the majority of unfit men with a minimum loss of desirable men. In the establishment of mental norms or standards for a given age or group, psychologists adhere to the rule that not less than 75 per cent of those examined should succeed on such tests. Of the applicants examined by these tests, 84.2 per cent succeeded on seven and more, scored by the number method, and 80.7 per cent succeeded by the point method. Among those failing by the latter method there were five who passed seven and more tests, of which number three were reported as average and desirable for the service. The standard fixed by the point method would therefore appear to exclude more desirable men. A minimum requirement of seven successfully passed tests, marked by the number method, would disqualify fewer desirables and practically the same number of undesirable men. This standard applied to the 140 applicants would have rejected 3.5 per cent of average men, but it would also have eliminated 41.7 per cent of all those who for various reasons were found undesirable after enlistment. Five (22.7 per cent) of those disqualified by it were definitely feeble-minded. A comparative analysis of the results of both methods leads to the conclusion that the number method of scoring and the standard of seven successfully passed tests, is best for recruiting examinations, because it definitely fixes a minimum, excludes fewer desirable men and would disqualify, based on the results of this station, about 42 per cent of all undesirables.

That there is a very good general correspondence between success on the tests and service efficiency is shown by the reports from the recruit depot on the grade of intelligence, aptitude, and behavior of 62 of those examined here. These reports are tabulated in Tables 3 and 4.

It will be found on averaging the grade of intelligence, aptitude, and behavior of those reported on that 94 per cent of the men succeeding by the number method were efficient and desirable. On the other hand, 82 per cent of those classed as substandards, including those accepted and lost to the service, as shown in Table 2, were below average in efficiency and undesirable. On the basis of these reports the average mark of those qualifying mentally by this standard would be 4.29 and of the substandards 1.54. Of those in groups A and B 98 per cent are rated as efficient and desirable.

Further evidence of the correlation between success on the tests and service efficiency is furnished by the results reported by Passed Assistant Surgeon G. E. Thomas, who applied the series to 100 marines and 300 prisoners at the naval prison, Portsmouth, N. H. These results and in comparison those of the applicants examined here are shown in Table 5.

Of the 12 marines failing 11 (91.6 per cent) were rated as inefficient and undesirable men, while only 3.3 per cent of those succeeding were considered below the desirable standard of military efficiency. Eighty-two per cent of the applicants failing were found undesirable and below average and 94 per cent of those succeeding desirable. Investigations have shown that from 25 to 30 per cent of civil reformatory and prison inmates are feeble-minded. Within the past few weeks 50 male prisoners at the Illinois State Penitentiary were examined mentally by Drs. Singer and Ordhal. Of this number 14 (28 per cent) were found to be positively feeble-minded. The mental condition of 300 prisoners confined in the Massachusetts State Prison was recently examined, with the result that 22 per cent were found to be definitely feeble-minded, 9.6 per cent were border-line cases and 3.3 per cent probably psychotic. The number of failures among the

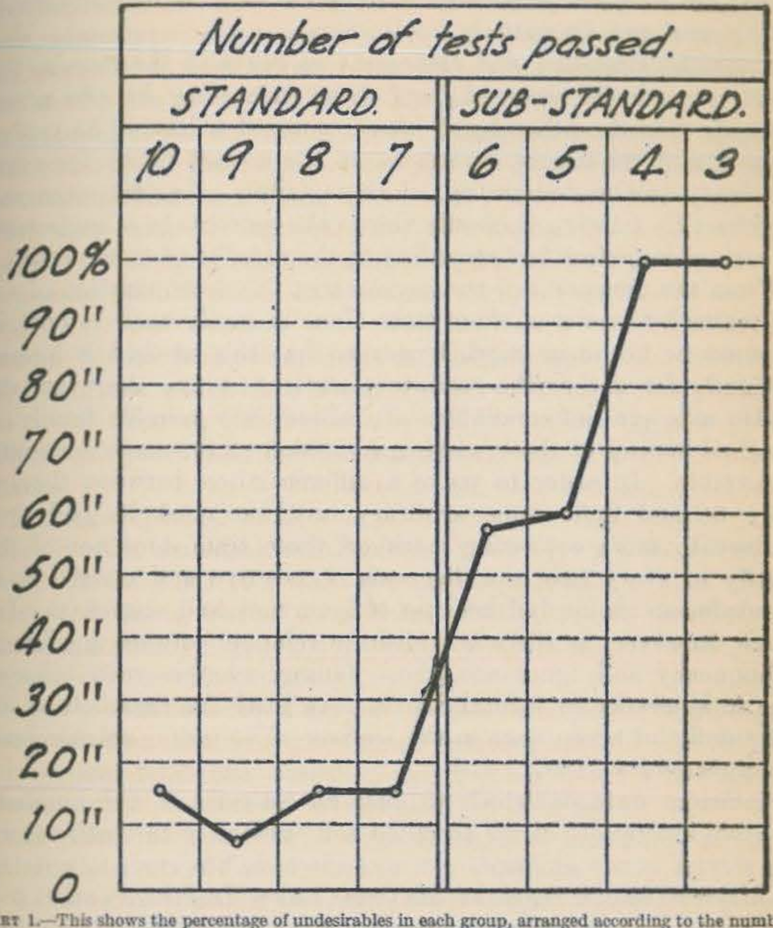


CHART 1.—This shows the percentage of undesirables in each group, arranged according to the number of tests passed.

naval prisoners, as reported by Thomas, corresponds therefore with the percentage of mental defectives found in similar civil institutions. It is of significance to note that of the 300 naval prisoners examined 14.3 per cent had, previous to enlistment, been inmates of prisons and reformatories and that 18 per cent of those failing had attended school two years and less. These results afford strong confirmation of the need and value of a uniform mental requirement for enlistment in order to eliminate many of the future candidates for naval penal and disciplinary institutions.

A loss by desertion and elopement en route to the recruit depot of 11 per cent is reported from those succeeding by the number method. On the other hand, there occurred a loss of 53 per cent from the above causes, rejections at the recruit depot for mental deficiency and undesirability, of those failing. In the accompanying chart (No. 1) is graphically shown the percentage of undesirables in each group, classified according to the number of tests passed.

From the viewpoint of the psychiatrist the determination of mental status by means of these tests alone is justly open to criticism. It must be borne in mind, however, that this method is intended primarily for use in the recruiting stations, where the usual diagnostic aids are not available. To obtain any reliable family and personal history of those seeking admission to the service is usually impossible. In order to make a differentiation between the mentally fit and unfit some arbitrary criterion must be laid down. Failure to score a passing mark on these tests does not of itself justify in every case the diagnosis of positive and clinical feeble-mindedness. Some fail because of ignorance and stupidity. Inasmuch, however, as there is a definite relation between inefficiency, delinquency and ignorance, those failing, whether such failure be due to ignorance or mental defect, may justly be regarded as mentally unfit for acceptance in the service. The term "substandards" is suggested for them.

Sufficient data on which to base an estimate of the number of positive mental defectives accepted and enlisted in the entire recruiting service is not at hand. It is of interest, however, to note that of fifty-two odd surveys at the Great Lakes Training Station 4 (7.6 per cent) were for mental defect. Of 42 rejections at the recruit depots of men accepted in the central division of the Marine Corps recruiting service 3 (7.1 per cent) were because of mental deficiency. That many of these undesirables can be detected and eliminated at the recruiting stations before any expense incident to their enlistment has been incurred is indicated by the results of the examinations at this station.

Dementia præcox, which is the most frequent psychosis occurring in the service, is often grafted on feeble-mindedness. The term "pfropfhebephrenie" has been given this form, meaning a grafted hebephrenia. Of 890 feeble-minded examined by Hichson, director of the Chicago Municipal Psychopathic Laboratory, 11.4 per cent were grafted hebephrenics. It is his belief that from 15 to 25 per cent of the feeble-minded in institutions are in reality dementia præcox cases of this type. He hopes to be able in the near future to show by means of visual memory tests, consisting of a series of drawings such as test 2 of the series used here, the peculiar mannerisms, stereotypy, disassociation, etc., of these præcox cases. It is not improbable that some of the dementia præcox cases found in the service are grafted hebephrenics and that perhaps some would be disqualified for enlistment by the suggested mental standard.

Because of the limited number of physically qualified men available for examination and the long time required to follow such men after they enter the service, efforts looking toward the establishment of a mental standard are handicapped in the recruiting station. A number sufficient for this purpose could be examined and the necessary observational study made at the training stations and recruit depots in a comparatively short time. The accuracy of the suggested mental standard, which is based on the results of the work done at this station, could be verified by the medical officers at the training stations and recruit depots from such further studies.

In summing up, the following points may be emphasized:

(*a*) Service undesirables fall generally into one of four classes.

(*b*) The majority of those in two of these classes can be detected in the recruiting station by the systematic application of a series of mental tests and could be eliminated by a minimum mental requirement for enlistment.

(*c*) The standard fixed by the number method of scoring is more practical than the point method, because it definitely establishes a minimum requirement and by it fewer desirables and nearly the same number of undesirables would be disqualified.

(*d*) About 12 per cent of those who qualify physically and are ordinarily accepted fail to meet this requirement.

(*e*) Of those failing—substandards—about 82 per cent have been found unfit and undesirable for the service; 22 per cent because of positive feeble-mindedness.

(*f*) Ninety-four per cent of those qualifying by the standard of seven successfully passed tests are reported as being of average to well above average efficiency and intelligence.

(*g*) This mental standard would disqualify about 3.5 per cent of such men who later prove efficient and desirable.

(*h*) Forty-one per cent of all undesirables in a series of 140 applicants examined failed to qualify by such a standard.

(*i*) Based on the number of failures among 300 naval prisoners to whom these tests were applied, such a mental requirement for enlistment would exclude about 30 per cent of those men who later find their way into naval prisons.

TABLE 1.

Number method.		Point method.	
Tests.	Number passed.	Groups.	Number passed.
10	36	A, 75 to 100 points	86
9	41	B, 60 to 75 points	27
8	27	C, 50 to 60 points	15
7	14	D, less than 50 points	12
6	12		
5	5		
4	4		
3	1		
Total	140	Total	140

TABLE 2.

Number applicant.	Number method, number tests passed.	Point method.		Accepted.	Report from recruit depot of accepted; previous history of rejected.
		Points scored.	Group.		
1	8	55	C	Yes	Intelligence average; aptitude very good.
2	7	55	C	Yes	Do.
3	7	52	C	Yes	Do.
4	7	50	C	Yes	Deserted.
5	7	58	C	Yes	Do.
6	6	52	C	Yes	Deserted; former inmate of State reformatory.
7	6	57	C	Yes	Deserted.
8	6	56	C	Yes	Declined oath; lack of stamina.
9	6	54	C	Yes	Do.
10	6	52	C	Yes	Do.
11	6	53	C	Yes	Intelligence average; aptitude average.
12	6	53	C	Yes	Do.
13	6	50	C	Yes	Do.
14	5	57	C	Yes	No report received.
15	5	50	C	Yes	Do.
16	6	48	D	Yes	Rejected at recruit depot; mentally deficient.
17	6	40	D	Yes	Do.
18	6	44	D	Yes	"In hands of civil authorities"; mentally deficient.
19	5	43	D	Yes	Below average; "mental slowness shown by work."
20	4	40	D	Yes	Below average; aptitude fair.
21	5	45	D	No	Mentally undesirable.
22	4	34	D	No	Mongolian imbecile.
23	5	32	D	No	Previous service in the Army.
24	3	32	D	No	Undesirable; tramp.
25	4	21	D	No	Former inmate Home for the Feeble-Minded.
26	6	45	D	No	Mentally deficient.
27	4	48	D	No	Previous confinement in naval prison for desertion.

TABLE 3.—*Number method.*

	Number tests.				Total.	Number tests			Total.
	10	9	8	7		6	5	4	
Number passed	17	20	14	5	56	4	1	1	6
Intelligence:									
Well above average	4	2	0	0	6	0	0	0	0
Above average	6	6	3	0	15	0	0	0	0
Average	7	11	10	4	32	2	0	0	2
Below average	0	1	1	1	3	2	1	1	4
Aptitude:									
Excellent	8	6	2	0	16	0	0	0	0
Very good	7	10	9	3	29	2	0	0	2
Good	2	3	8	2	10	1	0	0	1
Fair	0	1	0	0	1	1	1	1	3
Behavior:									
Excellent	15	13	9	2	39	3	0	0	3
Very good	1	5	3	2	11	0	0	0	0
Good	1	2	2	1	6	1	1	1	3
Squad leaders, signal men	4	3	2	0	9	0	0	0	0

TABLE 4.—*Point method.*

	Group.		Total.	Group.		Total.
	A.	B.		C.	D.	
Number	43	9	52	7	3	10
Intelligence:						
Well above average	6	0	6	0	0	0
Above average	11	4	15	0	0	0
Average	25	5	30	5	0	5
Below average	1	0	1	2	3	5
Aptitude:						
Excellent	13	3	16	0	0	0
Very good	26	5	31	0	0	0
Good	4	1	5	5	0	5
Fair	0	0	0	2	3	5
Behavior:						
Excellent	32	6	38	4	1	5
Very good	8	1	9	2	0	2
Good	3	2	5	1	2	3
Squad leaders, signal men	8	1	9	0	0	0

TABLE 5.

Tests.	Applicants.		Marines.		Prisoners.	
	Number passed.	Per cent.	Number passed.	Per cent.	Number passed.	Per cent.
10	36	25.7	25	25	19	6.3
9	41	29.2	33	33	71	23.3
8	27	19.2	17	17	61	20.3
7	14	10.0	13	13	60	20.0
6	12	8.5	8	8	37	12.3
5	5	3.5	3	3	29	9.6
4	4	2.8	0	0	11	3.6
3	1	.7	1	1	10	3.3
2	0	.0	0	0	2	.6
Total	140	....	100	....	300	....

Percentage of failures:	*Per cent.*
Applicants	15.7
Marines	12.0
Prisoners	29.6

A REPORT ON THE JENNINGS TEST FOR COLOR BLINDNESS.

By G. B. Trible, Passed Assistant Surgeon, United States Navy.

The Jennings test was favorably reported at the meeting of the Section on Ophthalmology held at Atlantic City in 1914 and at a later meeting the committee reported on a standard form of instructions for examining the color vision and a blank form for recording results of the test.

RECORD OF COLOR-SENSE.

Name____________ Examined at____________ Date____________191__

			G				
				R			
			R			R	
					G		
G		G					
					R		
R							
				G		G	
			G		G		
		R		R			
	R						R
	G						G
				G			
					R		
			R				
	G						

Prompt—Hesitating

Remarks

________________ Examiner.

The report of the committee states: "The Jennings test is a modification of the Holmgren colored-worsted test and is designed, first, to avoid soiling the worsteds by constant handling and, second, to have the applicant make a permanent record of his own color sense."

It consists of a square box divided into two compartments, each half having a lid—virtually two shallow boxes with bottoms joined together. In one side of the box is "Test No. 1, Green," containing a color board made up of greens and all the different colors, shades and tints likely to be mistaken by the color-blind for green. In the other side of the box is "Test No. 2, Rose," containing a color board made up of rose and all the different colors, shades and tints likely to be mistaken by the color-blind for rose. The color boards, like the box, are square, and each board has 64 patches of worsteds of various colors and shades, making a total of 128 colors used in the tests. Near each patch of colored worsted is a circular opening in the color board which is for the purpose of registering the particular patch or color chosen by the candidate. This he does by inserting a stylus or pointed pencil through the opening and punching a hole in the record sheet beneath the color board. The position of the patches of color and the circular openings have been arranged in an absolutely symmetrical design so that when the box is turned in any of four positions the same appearance is presented and it is impossible to know which is top or which is bottom. This prevents any memorizing of the test. The openings of the color board are so arranged that the record of both green and the rose tests are made on the same sheet. To the inside of one lid is attached a skein of standard green and to the inside of the other lid a skein of standard rose; these are the test colors employed.

The record sheet rests on a sheet of felting and is divided into spaces, each space corresponding to a patch of color. If the candidate has a perfect color sense, there will be a punch mark in every space marked by a letter G or R (G indicating green and R rose). Any punch mark in a blank space indicates a mistake. If the mistake is on a horizontal line with the letter G, the mistake was made in the green test. If the mistake was made on a horizontal line with the letter R, the mistake was made in the rose test. By comparing the record sheet with the color board by placing it in the box under the color board, one is able to see by the punched holes exactly what colors were selected to match the test skeins.

TO USE THE JENNINGS TEST.

The cover of the green side of the box is removed, the color board is lifted out, a record sheet on which the name of the candidate, his occupation and the date have been written is inserted, and the color board is replaced. In replacing the color board, *care must be taken to see that its top, marked on the back "No. 1, Green," corresponds to the top of the record sheet.* The box is now turned around several times until all sense of direction is lost. The green test skein fastened to the inside of the box lid is placed at a distance of 2 feet and the candidate is given the stylus or a pointed pencil and requested to look along each row of colored patches, and when he sees the test color, or one of its lighter or darker shades, he is to place the point of the stylus in the opening and punch a hole in the paper beneath. Have him understand that he is not expected to find an exact match for the test skein, but that he is to indicate all the color patches that appear to him of the same general color as the test skein, both those that are lighter and those that are darker in shade.

Having completed test No. 1, the record sheet is removed, the cover is replaced and the box turned over, exposing test No. 2, the rose. The same record sheet is placed under the rose color board, *care being taken to have the top of the record sheet and the top of the color board, marked on the back "No. 2, Rose," correspond.* The rose test skein is now displayed, and the test proceeds as before.

In making the test the examiner should instruct the applicant to start at the upper left hand corner and go slowly along one row before beginning the next. Proceeding in this systematic manner he is less likely to overlook some of the colors sought. If he fails to punch several of the test colors, he may be asked to go over the test again, in order to make sure that he has not missed any. *The most important duty of the examiner is to place the color board in the box so that its top (marked on the back) corresponds to the top of the record sheet.* After the examination has been completed the record sheet should be inserted, and a perfect test will show a punch hole in every space marked by a letter. If the applicant has punched in the proper openings and yet punch holes appear in the blank spaces then the color board was not placed correctly and the test must be made again.

This test avoids many of the cumbersome features of the Holmgren, is equally if not more accurate, and enables the examiner to record the result found. The colors are not soiled by handling, no important colors can be lost, the colors are not so large. Acquired cases of color blindness can be detected.

On the other hand, the committee recommended that a test be made with a lantern in every case in order to determine the acuteness of perception in the central portion of the retina where the light from a distant signal is focused, and also to determine the ability of the candidate to recognize and name correctly and promptly the colors of the signals he will have to use at night.

While this primarily was intended for railroad use, the conditions are similar in maritime occupations. The use of the lantern tests, whether Edridge-Green or Williams, is for the present limited to hospitals and large bases.

It is further recommended in case of examinations of color perception being made with this test that the records be sent to the bureau for file. These records will be of great assistance in determining the advisability of recommending waivers for defective color perception. The exact degree of error can be immediately obtained by placing the record properly under the standard card, as directed above.

THE UNITED STATES NAVAL MEDICAL SUPPLY DEPOT.

By R. P. CRANDALL, Medical Director, United States Navy.

The Naval Medical Supply Depot was originally known as the United States Naval Laboratory and had its beginning in a small laboratory established over the "pesthouse" of the United States Naval Hospital in Brooklyn, N. Y.

At first only a few standard medicines were prepared there for the use of this hospital. Gradually other hospitals were supplied, until, its value being recognized, Congress authorized the Navy Department to establish a pharmaceutical laboratory for the manufacture of important articles on the supply table. The laboratory was constructed and equipped in 1853, with Surgeon Benjamin F. Bache, United States Navy, as director of laboratory, and Passed Assistant Surgeon E. R. Squibb, United States Navy, as assistant director.

The difficulties, dangers and disappointments met with at first in the manufacture of medicines from the crude drugs were discouraging, but, as experience and skill were gradually acquired, successful results were soon obtained. Faulty mechanical appliances, defective stills, leaky retorts and connections, and a thousand and one obstacles had to be overcome before success was attained. In this connection a few extracts from Dr. Squibb's diary will illustrate his trials and tribulations.

"*Tuesday, March 8, 1853.*—Went to work at the laboratory at my chloroform distillation and worked hard all day with very poor success, having at the end of the day missed one charge and having only about 9 ounces of chloroform. This was very discouraging with good materials and everything right, but knowledge and skill. In the afternoon left the still and went down to my furnace room and under difficulties for want of a crucible, dried my chloride of calcium, breaking in the process a large, fine porcelain dish. Thus ended this most unsatisfactory day's work.

"*Sunday, April 17, 1853.*—During the past week occupied almost entirely in the laboratory in making phosphoric acid and phosphate of ammonia. On Thursday I had the misfortune to see a 3-gallon retort break on the sand bath with almost 2 pounds of phosphorus and 12 of acid and the whole of it with two days labor lost, and the house nearly set on fire and I nearly suffocated with the fumes."

Here Dr. Squibb first experimented in the manufacture of ether by steam heat, a process which materially lessened the dangers of its production. His apparatus and method of preparation he fully describes in an article in the American Journal of Pharmacy for September, 1856.

Dr. Squibb remained on duty at the laboratory until 1857 when he resigned to enter commercial life and later founded the house which still bears his name. His subsequent success in civil life was undoubtedly due to the skill and experience he acquired while assistant director of the laboratory.

Soon after the close of the Civil War the laboratory ceased to manufacture medicines. New and improved methods of manufacture had come into general use and these articles could be obtained from dealers at much less than the cost of manufacture at the laboratory. The laboratory has continued, however, to manufacture boat boxes, medicine chests, test cases, fracture boxes, packing cases, etc.

In 1893, on the recommendation of Surgeon General J. Rufus Tryon, United States Navy, the title became "Naval Laboratory and Department of Instruction," as a course of instruction was then being given for assistant surgeons by the laboratory staff and the members of the Naval Medical Examining Board who held their sessions at this time in the laboratory building. Thus began our present Naval Medical School.

In 1902 the Naval Medical School was established in Washington, D. C., and the laboratory resumed its old title of Naval Laboratory. The present title, Naval Medical Supply Depot, was authorized by the Secretary of the Navy, May 26, 1905, and the present building was fully occupied in 1906 and the old laboratory building turned over to the hospital for wards, storerooms, etc.

The present depot, situated in the grounds of the Naval Hospital, Brooklyn, N. Y., is a commodious modern structure of stone, consisting of two stories, basement and attic, equipped with a chemical and physical laboratory, a carpenter shop and metal shelving and cases for the storage of drugs and instruments. While sufficient for the needs of the service at the time of its construction, it is now inadequate for the demands made upon it and a new addition has been recommended.

The working staff of the depot consists, besides the commanding officer, of 2 pharmacists, 7 hospital corpsmen and 13 civil employees. One pharmacist acts as executive officer and one as chemist. The hospital corpsmen act as bookkeepers, receiving and shipping clerks and laboratory assistants. The civil employees consist of carpenters, storekeepers, packers, laborers and driver. A 4-ton motor truck and two horse trucks handle the shipments.

The efficiency of the depot has recently been vastly increased by the installation of a fully equipped chemical and physical test laboratory under the direction of an expert chemist.

Formerly all supplies not strictly medical were required to show "type, construction and quality" equal to standard sample, the same being kept on exhibition at the depot for inspection of bidders. Deliveries were accepted if found satisfactory when compared with the standard sample. Drugs were required to comply with United

States Pharmacopœia tests for purity, which tests, however, were seldom made. For obvious reasons these methods were highly unsatisfactory, as no chemical analysis or mechanical tests were ever applied. Inspection only determined whether or not the article received compared favorably with the standard sample.

Specifications are now prepared for drugs, chemicals, fabrics, rubber goods, agateware and all other classes of articles issued to the service.

The sample submitted by a bidder is examined to determine its compliance with the specifications before making award and each subsequent partial or complete delivery of the successful bidder is examined as to specified requirements before acceptance.

Surgical instruments are inspected at the factory of the successful bidder at the time of forging and again before hardening, tempering and finishing.

The inspection of sterilized catgut ligatures is made at the place of manufacture, before, during and after sterilization and, when the finished material is delivered, further tests are made as to pliability and tensile strength. A specially designed apparatus is used in testing for tensile strength and breaking strain of textiles, rubber and ligatures.

Metallic caskets are inspected individually by immersion test, before acceptance.

All drugs and chemicals are submitted to a complete chemical analysis to determine compliance with U. S. Pharmacopoeia, or other standard requirements. Drugs are frequently rejected as containing dirt or being improperly labeled, stoppered or wrapped.

Instruments of precision such as clinical thermometers, sphygmomanometers, are individually tested for accuracy before being accepted or issued. The amount of work handled by this department of the depot for the first six months of the present year is shown by the following statement on number and results of deliveries only, viz:

216 analyses drug deliveries	24 rejections.
55 analyses hypodermic tablets	13 rejections.
46 analyses textiles	No rejections.
13 analyses rubber goods	2 rejections.
35 analyses instruments	4 rejections.
29 analyses surgeons' necessaries	7 rejections.

New medicinal preparations, surgical instruments and appliances, etc., are constantly being examined and tested with a view to their employment in the service should they prove useful.

Owing to the European war, market conditions have changed very considerably. Certain preparations, such as novocain, eucain, ichthyol, etc., are not on the market, while others, such as antipyrin, phenacetin, etc., are prohibitive in price. Accordingly the depot, after experimenting with six preparations, found one that could be substituted for ichthyol, having practically the same properties. Acetanilid was substituted for phenacetin and antipyrin. Thus while it would seem an easy matter to make out and send in a requisition it is by no means so easy to fill. The continuous rise in price and the scarcity of raw material, especially in certain metals, often cause considerable delay in obtaining the finished article.

Upon the receipt of an approved requisition the depot's procedure is as follows: The requisition is first carded and indexed and then placed among the requisitions to be filled, in the order of its receipt. In its proper order it then goes to the packing floor and is filled. The articles are first checked from the shelves, where they are arranged in alphabetical order, to a portable table and again checked to the assembly table. After complete assembly everything is once more checked and again checked into the packing cases, thus reducing the possibility of error to a minimum. After packing the cases are labelled and numbered, notation is made opposite each article on the packing list and a file invoice of the number of the case containing it.

As required by interstate commerce laws cases containing certain articles are specially labelled. Thus, alcohol, collodion, and ether require a red caution label; picric acid, potassium permanganate, potassium chlorate, a yellow one; nitric, hydrochloric and sulphuric acids a white one and compressed gases a green one. In most cases it is necessary to send these specially labelled goods by express, as most transportation companies refuse to handle this class of goods. The cases then go to the shipping floor where they are weighed and measured for the preparation of bills of lading. They are then shipped to destination either direct from the depot, through the supply officer of the navy yard, by Navy transport, or by other public conveyance and notation made as to same on card index, file invoice, and daily shipping card to Bureau of Medicine and Surgery. On notice of arrival of shipment at its destination note is made on card index to that effect, thus completing the transaction.

Should any article on the requisition be an extra article or not in stock, a request for the same is made on the supply officer of the navy yard, with a list of dealers to whom proposals are to be sent, asking for bids on the article required. Full specifications accompany the request and sample is required where possible. After a stated time the bids are opened at the supply department and forwarded to the depot for recommendation as to award.

The bid that meets the full requirements of the specifications, and is satisfactory in the sample submitted, is accepted. Should the delivery of the successful bidder not be equal to sample submitted it is rejected and immediate replacement is requested. If the delivery is not replaced within a reasonable time the supply officer of the yard is requested to purchase in the open market against the firm's account, the difference being charged to the firm failing to make the delivery.

The depot stock is kept up by annually approved requisitions covering all classes of articles issued. Successful bidders must supply at least 50 per cent of required article and not less than 10 per cent at any time, when called upon to do so, and must further agree to supply more or less of the amount of the entire bid should occasion require.

Other requisitions covering extra articles and repair of instruments turned in on surveys are made annually and requests are made under them from time to time during the year.

To estimate the amount required for these annual requisitions for the ensuing fiscal year the depot considers the issues for the past fiscal year together with the stock on hand on which to make its basis. Estimates for the present fiscal year were largely increased owing to the prospective development of the service and the many expeditionary outfits now in the field.

The medical supply depots at Canacao and Mare Island and stations beyond the seas are supplied from this depot, also ships on foreign stations requiring special and dental articles not supplied by the other depots. The parcel-post system is frequently taken advantage of in making small shipments to domestic and foreign stations. Recent shipments made in this manner to the *Scorpion* in Turkish waters and to other ships in the Mediterranean arrived in safety.

When a ship in course of construction is sufficiently advanced to receive them the surgical cabinet, operating table, utensil cabinet, etc., are sent to the construction officer to be installed in the operating room, the instruments and utensils being forwarded later with the medical outfit, when the ship goes in commission.

The depot is constantly making additions, alterations and improvements as advances in medical and surgical science dictate. A very recent improvement is the substitution of a canvas roll for the instruments formerly contained in a metal case in the expeditionary and boat surgical case, thus decreasing the weight and expense considerably and facilitating packing and portability. With this exception all surgical instruments are now issued in metal cases, the names and outline of each instrument being engraved beneath it on the floor of the case or tray. This in itself serves as an education to the hospital corpsmen and insures proper replacement in the case after use. Cases, expeditionary and boat, medical and surgical, are no longer put up in wooden boxes, but are packed in fibre cases of the "dress suit case" pattern and are inclosed in khaki covers with longitudinal straps for ease in carrying upon the back.

The first-aid package with hooks for attaching it to the belt has been replaced by a package to be slipped into a receptacle in the belt. It was found that the hooks frequently become detached, leaving an opening in the packet rendering it pervious.

The depot now carries a complete stock of dental equipment, the assembly and inspection of which necessitated much care and hard work.

Wherever possible the depot staff visits the laboratories and factories whence the depot draws its supplies in order to make itself familiar with methods of manufacture and preparation, with a view to the drawing up of specifications based on actual study and observation.

No opportunity is neglected to improve and perfect the already high standard of the depot and to increase its efficiency and usefulness to the service.

POISONING BY ARSENIURETTED HYDROGEN ON SUBMARINES.

By M. GIORDANO, Captain, Medical Corps, Italian Navy.

Condensed and translated from Annali di Medicina Navale e Coloniale Sett.-Ottob. 1916, by J. S. Taylor, Surgeon, United States Navy.

Certain recently reported physical disturbances in the crew of a submarine of one of the allies were ascribed to some of the commoner causes of impaired health on this type of vessel, but soon afterwards on two submarines of the same nation the same type of disorder appeared with far more serious symptoms and every indication of acute poisoning, originating on the vessels themselves. Briefly summarized the facts are as follows:

In July the submarine "X" was submerged for 16 hours. The crew showed signs of an intoxication ascribed to conditions of temperature and pressure. Similar or worse conditions of atmosphere and pressure had prevailed on this and other vessels previously without such untoward results. On August 14 another submarine, the "Z," after 15 hours under water was compelled to return to port with 17 out of a crew of 26 overwhelmed by a toxic disorder not previously observed, except in minor degree, in the July case. The sea was calm, the storage batteries had recently been charged, trial dives had only lasted 6 hours, the crew had just enjoyed a good rest and was thoroughly used to submarine work and on that day the diet was wholly of fresh food. The "Z" was divided by a water-tight bulkhead into two wholly separate compartments. In the after part were 9, in the forward part 17 persons. The latter contained the storage batteries and an oxylite-S apparatus for oxygen production, which had been in operation during the second half of the submergence. Air, driven by blowers placed over the apparatus, was renewed and driven in a forward direction. Oxygen had been ample, as proved by the activity of a light which had to be lit on the deck toward the end of the submergence. Temperature had not risen above the average, and the increase of pressure was only 8 mm. The 9 people in the after compartment were in no way affected, while all 17, including officers, in the forward compartment were taken sick in the following order: The first case occurred after 9 hours submergence, the second after 12 hours, four cases after 14 hours, seven cases when the submarine came up. All had the following symptoms: Nausea, vomiting, malaise, burning sensation in the throat, metallic taste in the mouth, intestinal griping, more or less diarrhea, headache, vertigo, muscular weakness. Except for the intractable vomiting the symptoms were greatly aggravated subsequent to the underwater cruise. By the following day nausea or intermittent vomiting was still present, headache was less; all 17 had jaundice.

All the patients were well accustomed to submarine diving and gave a negative anamnesis. All had jaundice, which increased for 48 hours, while one retained an icteric hue for 12 days. Headache, anorexia, insomnia lasted two days. In two cases the burning of the pharynx lasted equally long. The stools were at first liquid, then chalky and pale. Tenderness over the liver was present and slight enlargement of the organ in some cases. The psychic effects of the poisoning were marked. There were no fatalities and 15 days sufficed for a cure, only general muscular weakness and great lassitude due to accompanying anemia remaining. Urinalysis showed presence of urobilin and traces of bilirubin.

Blood examination in the eight most severe cases.

Case.	Red cells.	Hb.	Globular resistance.	White cells.	Serum.
1	2,425,000	60	0.28	6,500	Red.
2	2,750,000	65	0.26	7,200	Red, basophile granulations.
3	2,525,000	60	0.28	7,000	Pink.
4	2,760,000	70	0.26	6,300	Red.
5	2,500,000	60	0.28	6,000	Red, basophile granulations.
6	2,422,000	65	0.28	6,500	Red.
7	3,000,000	65	0.30	7,000	Yellowish.
8	2,900,000	60	0.28	6,900	Red.

Microscopic examination showed, beside normal forms, many dwarf red cells and macrocytes. Poikilocytosis was marked. Some preparations showed a few nucleated erythrocytes. Of the erythrocytes 40 to 50 per cent showed in their substance a granulo-filamentous appearance.

The blood examination proves that a distinct anemia existed in these cases and the basophile granulations, the increase of eosinophiles lead to the suspicion of an intoxication (such as occurs with lead poisoning), while the numerous microcytes, the polychromatophilia and the abundant granulo-filamentous material we know to be the accompaniment of hemolytic icterus. Furthermore, the varying tints of the serum, from red to rose, prove a hemolysis in the vessels.

The globular tension tested by Ribierre's method varied from 0.26 to 0.30, and as maximum normal resistance is 0.36 to 0.34 it is evident that a distinct increase was present. It is held to-day that globular tension is reduced in hemolytic jaundice and increased in retention jaundice. The above observations would tend to show an increase of globular resistance, at least in some forms of hemolytic jaundice, which can be explained by admitting that after the action of a poison capable of producing hemolysis the red cells that remain succeed in fixing hemoglobin to their stroma more tenaciously.

We can strike from our pathology to-day the old distinction between hepatogenous and hematogenous jaundice, and even in our present cases, where undoubtedly the prime cause of morbid processes is to be found in the increased destruction of red cells in circulating blood, due to toxic causes, we find a direct participation by the liver (as shown by tenderness and enlargement), due probably to the fact that bile becomes more concentrated, thicker, more tenacious, so as to distinctly increase pressure in the bile ducts, causing reabsorption through the lymphatics. In the present cases one is in doubt whether to add an irritation of the bile canaliculi due to the same poison which caused the hemolysis in the circulation or one due to the derivatives of that poison in the bile.

While the patients discussed above were still inmates of the hospital another submarine, the "Y," was experiencing identical phenomena of intoxication. During two submergences of 15 and 10 hours' duration, respectively, on August 23, the entire personnel presented the symptoms enumerated above as developing on board the "Z," though they were less severe in type. Between the two divings the batteries had been charged on board. There was no marked rise in barometric pressure and though the oxylite had not been employed there was an abundance of oxygen in the respired air.

The entire personnel, by the end of the submerged period or immediately thereafter, experienced nausea, vomiting, colic, pain in the throat and headache. On the day following headache and insomnia continued and nearly all had more or less icteric tint. Blood examination of two patients showed, though in less degree, changes of corpuscles and serum and liver involvement as found in the patients from the "Z."

It is also to be noted that, on the day following the poisoning, one patient developed a herpes zoster involving the right hemithorax and another had an eruption on the face, back of forearms, elbows, knees and front surfaces of the legs, of red papules, confluent or discrete, which lasted 12 days.

We conclude from the study of the above facts that during the long submergences of these two submarines the air on board of them contained toxic gases. Food as a source of poison was properly excluded. It is to be noted that on the "Z" only persons in the forward compartment were affected. On the "Y," which is not divided by a water-tight bulkhead, all were affected. The forward compartment of the "Z" contained the storage batteries.

There was one condition common to both submarines on the occasion of these underwater cruises, and it is the only one which was peculiar to them both: The storage batteries had just been renewed and were working for the first time during a prolonged submergence. In all other respects as to time and place the dives were in no sense different from those which the two submarines had been repeatedly performing through a period of many months in commission.

In these two vessels the storage batteries, type TEM, are not provided with air-tight covers and the openings for ventilation inside the containers are in direct communication with the surrounding air.

The lead plates are enveloped in bags of amianthus (asbestos) to prevent the crystals of PbO_2, which form especially on the positive plates, from falling to the bottom as a result of ship's oscillations, pitching, etc.

Reviewing hurriedly the installations on a submarine which tend to chemical vitiation of air, we note the presence of naphtha combustion engines for cruising on the surface, which evolve volatile hydrocarbons from the gasoline and lubricating oils, and electric motors for under-water navigation which liberate sulphuretted hydrogen and sulphurous anhydrid. However, the gases from the electric motors occur only in minute traces in submarines and have little bearing on health. The presence in the air of submarines of carbon monoxide, ammonia, nitrous acid and nitric acid and chlorine has not been reported.

Belli and Olivi have concluded that for persons shut up for 24 hours in a submarine the presence of SO_2 and H_2S (grammes 0.307 and 0.0095 per cubic meter, respectively), produce no marked blood changes either in corpuscular or fluid constituents.

It was necessary, in view of the above facts, to look for some other cause for the incidents related, and it was assumed that it lay in some impurity or extraneous substance connected with the storage batteries. One of the impurities that suggested itself was arsenic, which is known to occur in the form of arsenious acid in H_2SO_4, in lead, and in the case being studied, in the amianthus (asbestos) from which are made the bags containing the lead plates. Clinical observations and symptoms of arsenic poisoning strengthened the suspicion that this line of research was justified.

Chemical analysis of the storage batteries shows the presence of arsenic in the asbestos and traces of arseniuretted hydrogen in the surrounding air when they were in operation on the submarines *Y* and *Z*.

The cases of poisoning reported on these two vessels are therefore ascribed to the arsenic contained in the asbestos bags, which were new and being used for the first time in a prolonged submergence, and to the absence of air-tight covers to the storage batteries and to the evolution of hydrogen and arseniuretted hydrogen when the batteries were discharging. It is believed that after the batteries have been repeatedly charged and discharged there would be a complete elimination of this source of danger through exhaustion of arsenical impurities.

After the occurrences on *Y* and *Z* careful experiments were made on various animals (dogs, rabbits and pigeons) shut in the compartments containing the storage batteries after the latter had been repeatedly charged and discharged. These animals were carefully studied before and after submergence, under conditions otherwise identical with those which attended the poisoning of the crew, and the only effect noted was a slight reduction in the number of erythrocytes after 24 hours under water.

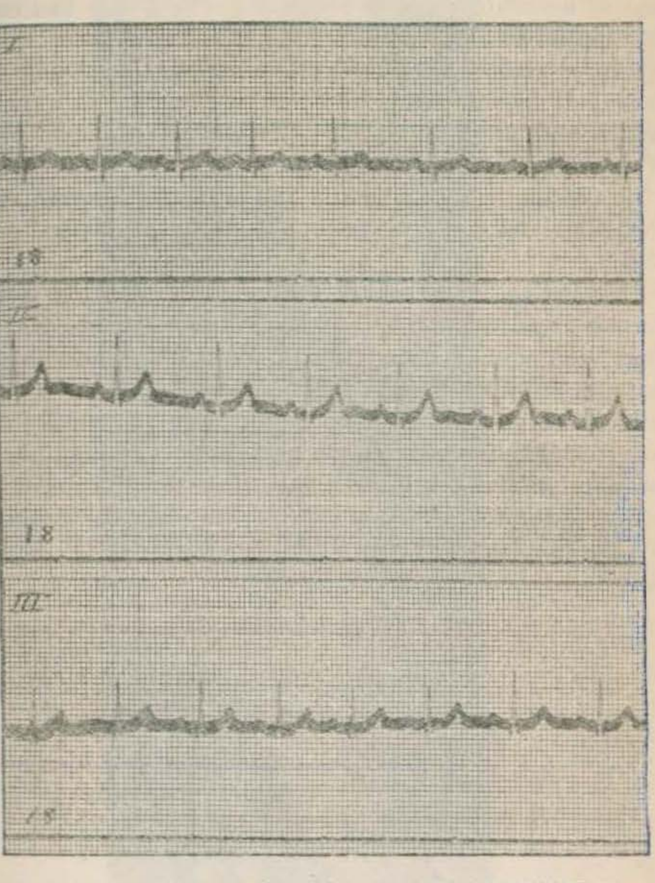
Following this test the submarines in question were ordered back to their regular station and further research along these lines was impossible. It is to be hoped, however, that the report of these phenomina and the proffered explanation of them will stimulate observation and study of conditions on submarines in view of the close relation between the physical and moral soundness of the personnel and the military efficiency of this important weapon of modern naval warfare.

BORDER-LINE CASES AT THE RECRUITING OFFICE.

By W. G. FARWELL, Surgeon, United States Navy.

The entry of the United States into the war has stimulated recruiting for the Navy to a marked degree, 3,213 applicants having been examined at the New York recruiting station during April, 1917, in contrast to the monthly average of 497 for 1916.

This accelerated recruiting has correspondingly increased the number of "border-line cases," by which is meant applicants having slight degrees of disability on lines distinctly and specifically mentioned as causes of rejection, such as varicose veins, underweight, bunions and corns, slight flat feet, various slight deformities, etc., in which it is frequently very difficult to decide whether these men should be accepted or rejected. In many such cases a decision is quickly and correctly made by medical officers whose experience of actual service conditions gives them an instinctive appreciation of the real significance of certain physical defects, so that frequently an apparently trivial defect is recognized as the index of a serious underlying condition, while on the other hand a defect which appears marked on casual observation may be no real bar to useful service.



CASE 18.—Normal electrocardiographic tracing; displacement of the heart.

Often, however, even the experienced examiner must hesitate as to his duty, while the young and inexperienced medical officer must be constantly in doubt as to the right course to pursue. The embarrassment of the tyro is often increased by the urging of his recruiting officer who is desirous, naturally, of securing the greatest possible number of enlistments.

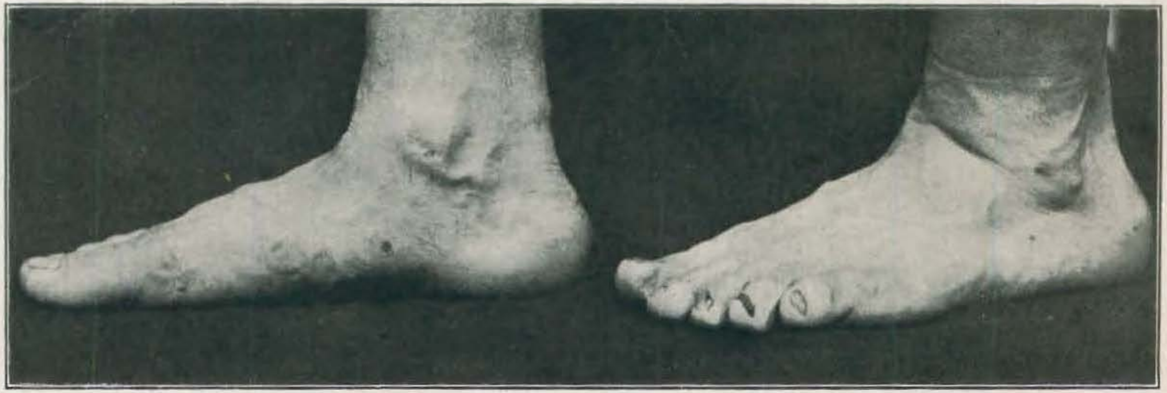
It is important that inexperienced examiners should appreciate the necessity of selecting none but suitable recruits. A poor recruit is a waste of money and of valuable time; often he is subjected to a strain that endangers his own health and more often he endangers the health of others. In border-line cases the recourse to a waiver request to the bureau is available, but in many instances the final authority there must be in doubt as to the degree of significance of defects reported, especially when, as is frequently the case, the defect is not fully described in the waiver.

With these facts in view, and recognizing the vast importance at this time of accurate work in recruiting, the writer has collected a series of "border-line cases."

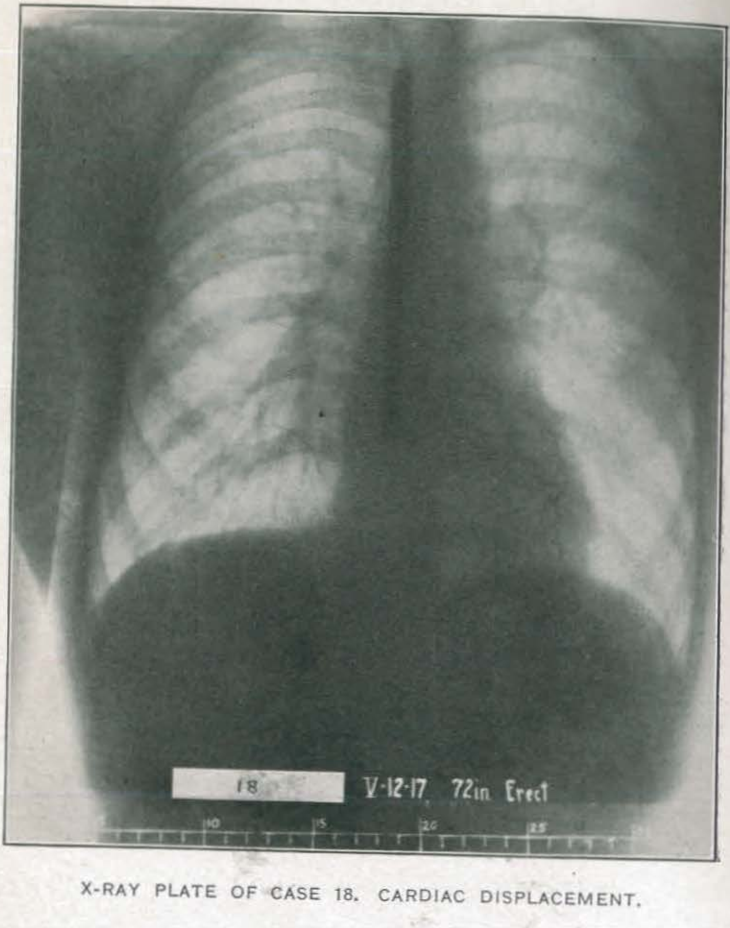
As we have statute law and common law, the former expressed in definite and specific terms of limitation, while the latter is based on practice and previous decisions, so it was thought possible to present a series of cases showing what the decision was in each case where the circular relating to the physical examination of recruits and the medical instructions left something to the medical examiner's discretion.

The Russell Sage Institute of Pathology is working along somewhat similar lines in the study of normal and pathological subjects, and it has been possible through their kind courtesy to obtain excellent photographs of various physical defects.

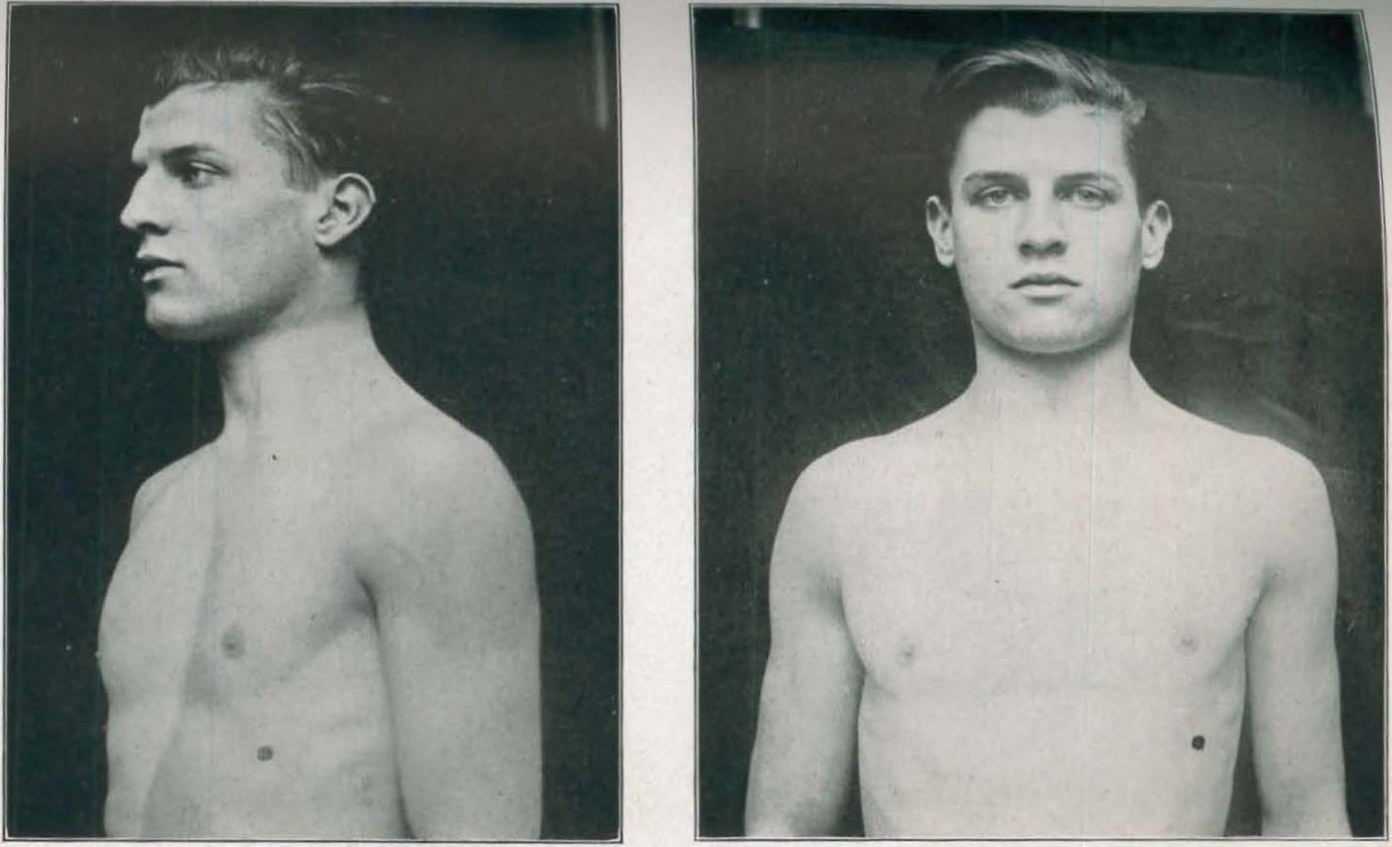
In order to serve as a ready guide for future recruiting work it is proposed to publish from time to time some of these photographs with the permission of the Russell Sage Institute and the enthusiastic cooperation of the following-named medical officers: Assistant Surgeons W. S. Thomas, M. R. C.; E. W. Gould, M. R. C.; E. M. Riley, M. R. C.; and E. F. Du Bois, R. F.



NO. 1.—FLAT FEET. REJECTED.

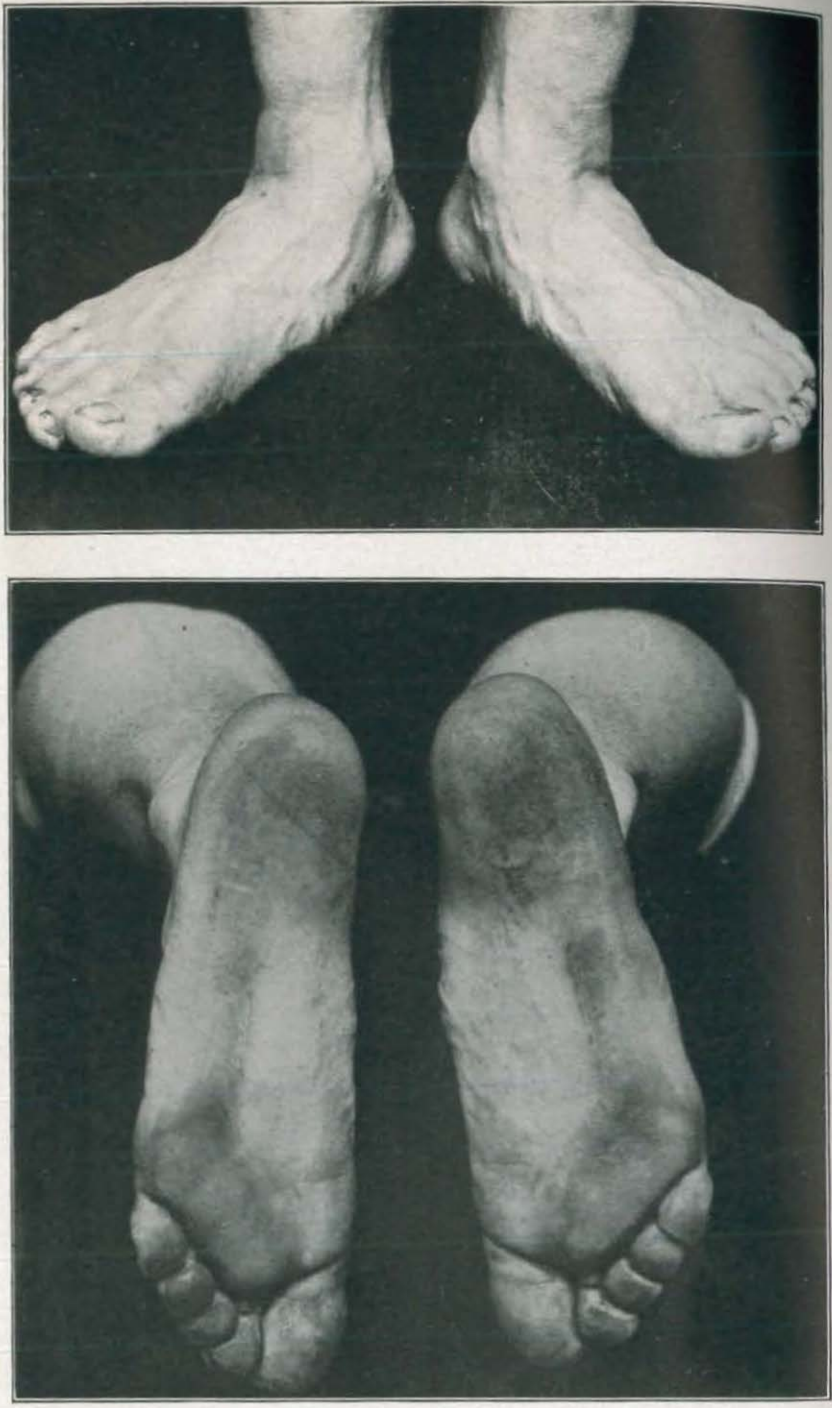


X-RAY PLATE OF CASE 18. CARDIAC DISPLACEMENT.



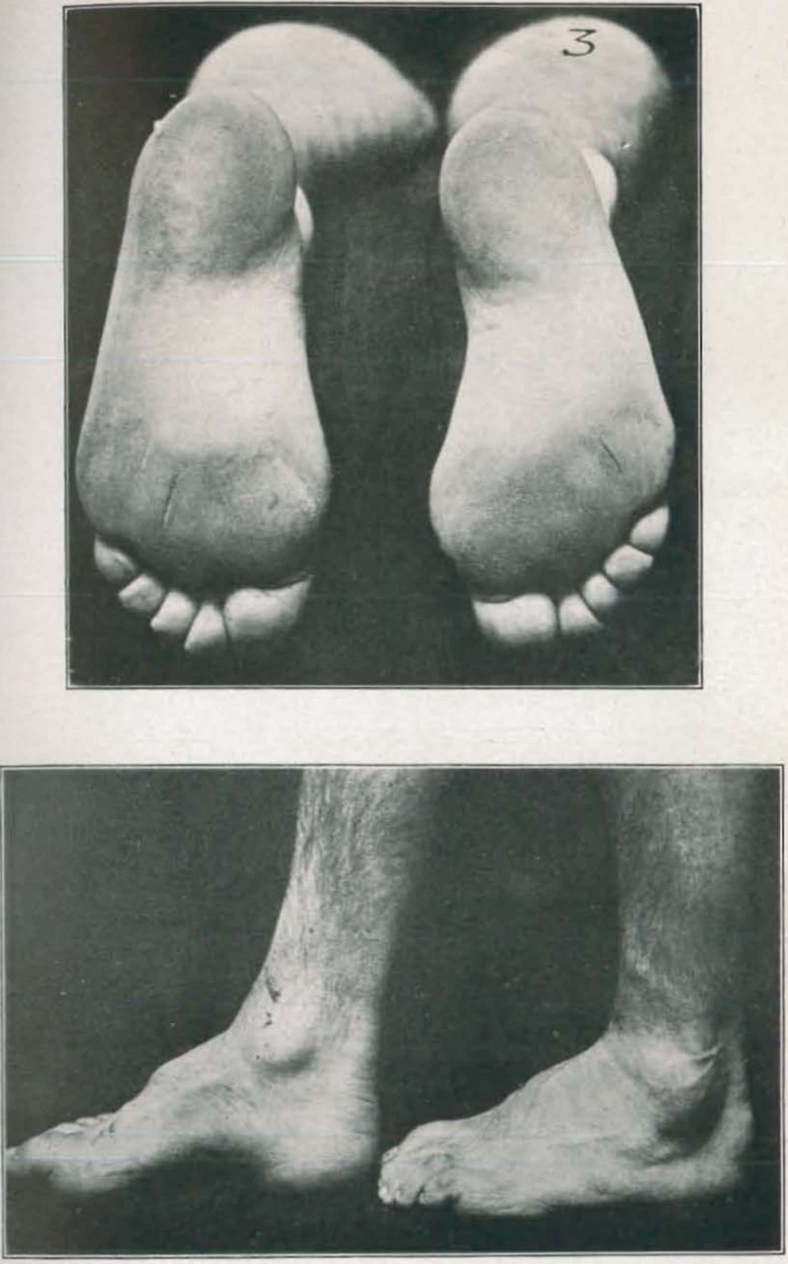
NO. 18.—DISPLACEMENT OF HEART.

Age, 20 years 6 months; height, 66⅞; weight, 134 pounds. The boy is an athlete and competes in the half-mile run. General condition excellent. Heart displaced. Apex impulse, as shown by dot, in the sixth space 4½ from mid line. Depression of sternum marked. Mediastinal space much diminished. X-ray plate shows displaced heart of normal size. Electrocardiagraphic tracings normal. Request for waiver was accompanied by photographs. Accepted by Bureau of Medicine and Surgery.



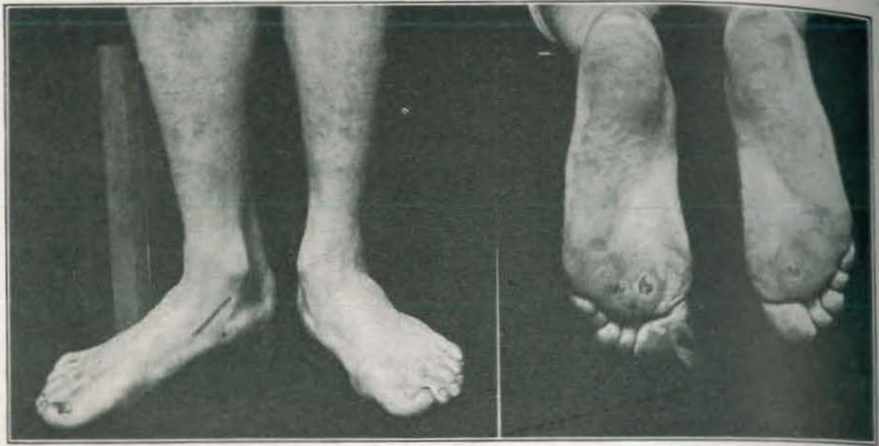
NO. 1.—FLAT FEET.

Age, 17 years; height, 64¼; weight, 139½ pounds. Physique good. Feet: R. Tubercle 1 inch below Feiss line; L. Tubercle 1 inch below Feiss line. Shoes No. 8. Breadth of feet: R. 4⅛; L. 4⅛. Function good. Symptoms denied. Rejected.



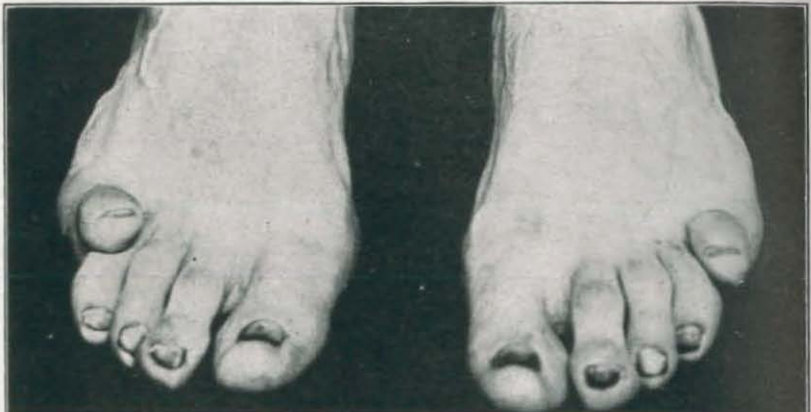
NO. 3.—DEFORMED FEET.

Age, 18 years; height, 63¾; weight, 119 pounds. Physique fair. Has been working on delivery wagon, walking a great deal. Symptoms denied. Dorsal flexion of feet limited to 90°. Rejected. Would be unable to wear service shoes.



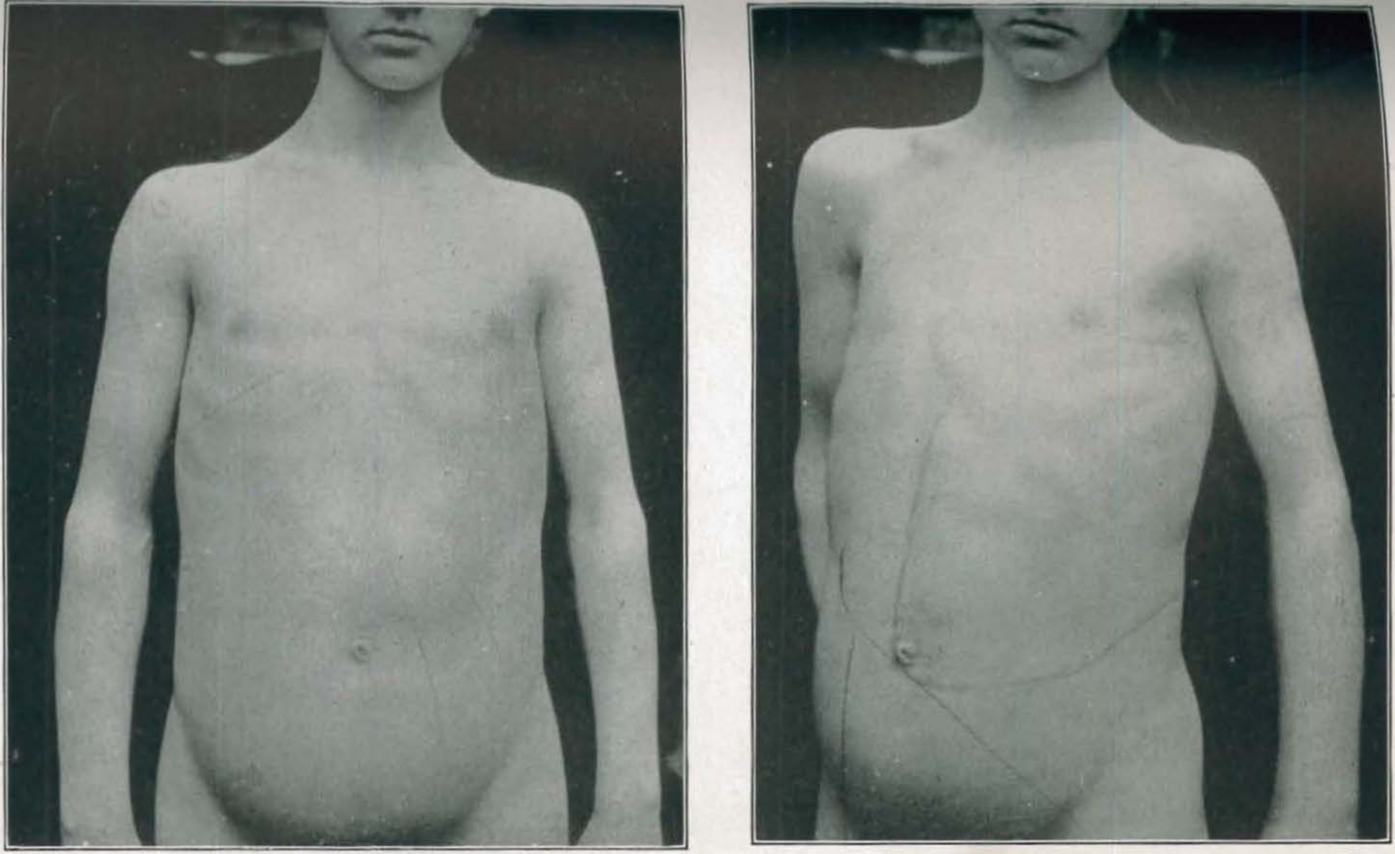
NO. 4.—FLAT FEET.

Age, 21 years; height, 66; weight, 150 pounds. Painter in Pennsylvania Railroad shops. Was in Navy 2½ years. Discharged by Medical Survey on July 13, 1916, diagnosis pes planus: "The arches of both feet moderately depressed. He is incapacitated for duty because of pain in feet and legs after walking or standing." Feet: R. tubercle ⅞ below Feiss line; L. tubercle ⅞ below Feiss line. Shoe No. 9. Breadth of foot: R., 4⅛; L., 4⅛. Wore arch supports about six months; stopped two months ago. Now has no symptoms. Desires reenlistment. Rejected on history.



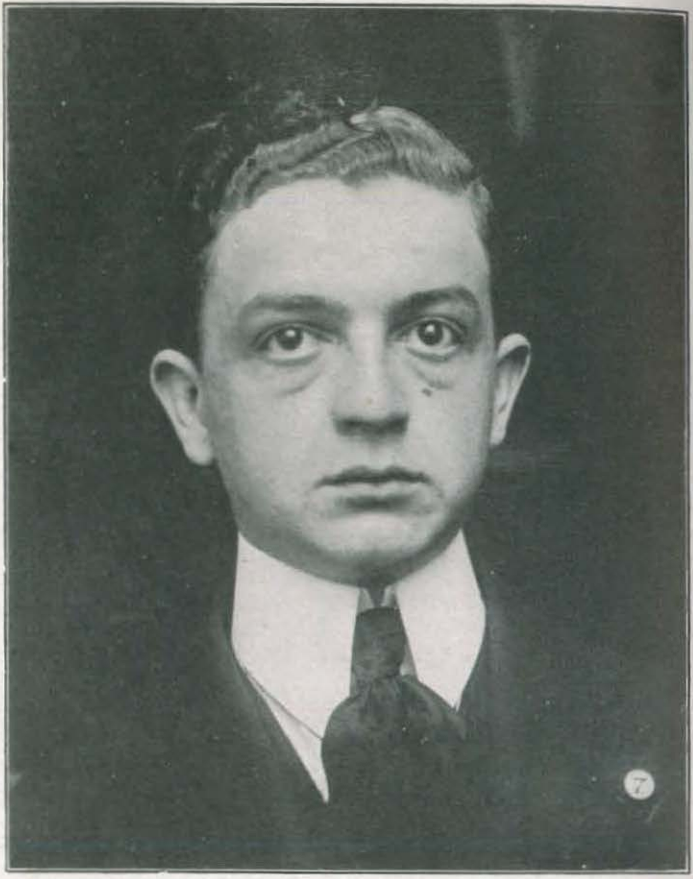
NO. 24.—OVERLAPPING TOES.

Age, 19 years 2 months; height, 65¾; weight, 121 pounds. Little toes have overlapped as long as he can remember. Rejected. Rejection should be invariable if toes show callosities.



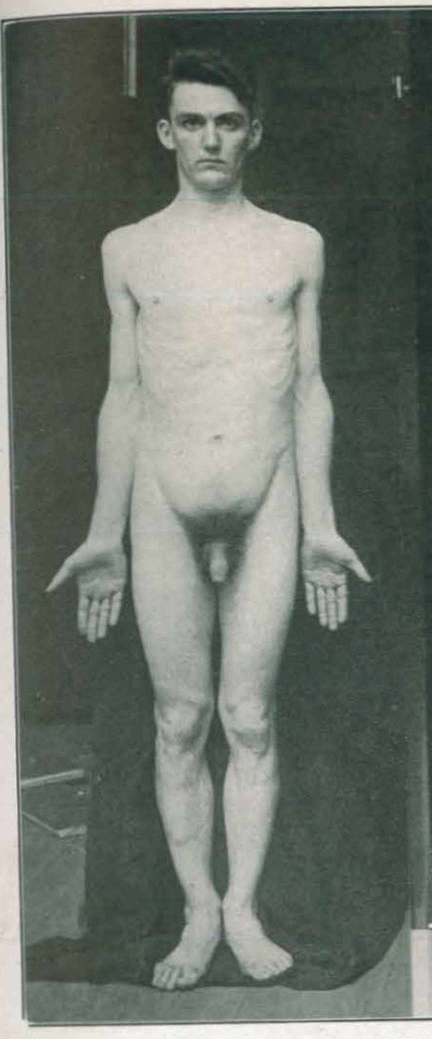
NO. 6.—ENLARGED SPLEEN.

Age, 17 years 11 months; height, 64⅞; weight, 131½ pounds. General health good. Symptoms denied. This is intended to show the flaring of lower ribs and abdomen which led the surgeon to make a careful examination. The spleen is enormously enlarged. Rejected.

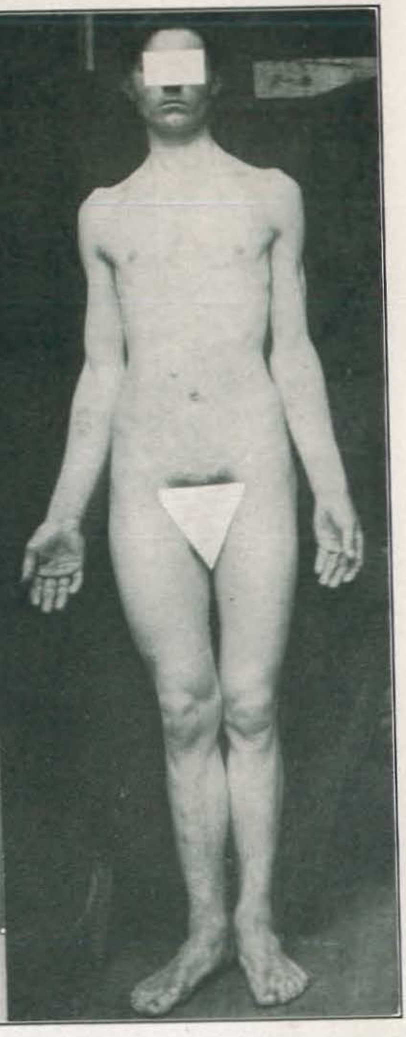


NO. 7.—EDEMA OF EYELIDS.

Age, 20 years; height, 66½; weight, 124½ pounds. Says that he has always had edema below eyes. No other symptoms of renal or cardiac disease. Urinalysis made on suspicion of nephritis. Specific gravity 1021; reaction alkaline; albumin, slightest possible trace. No casts. Rejected on account of edema and albumin.



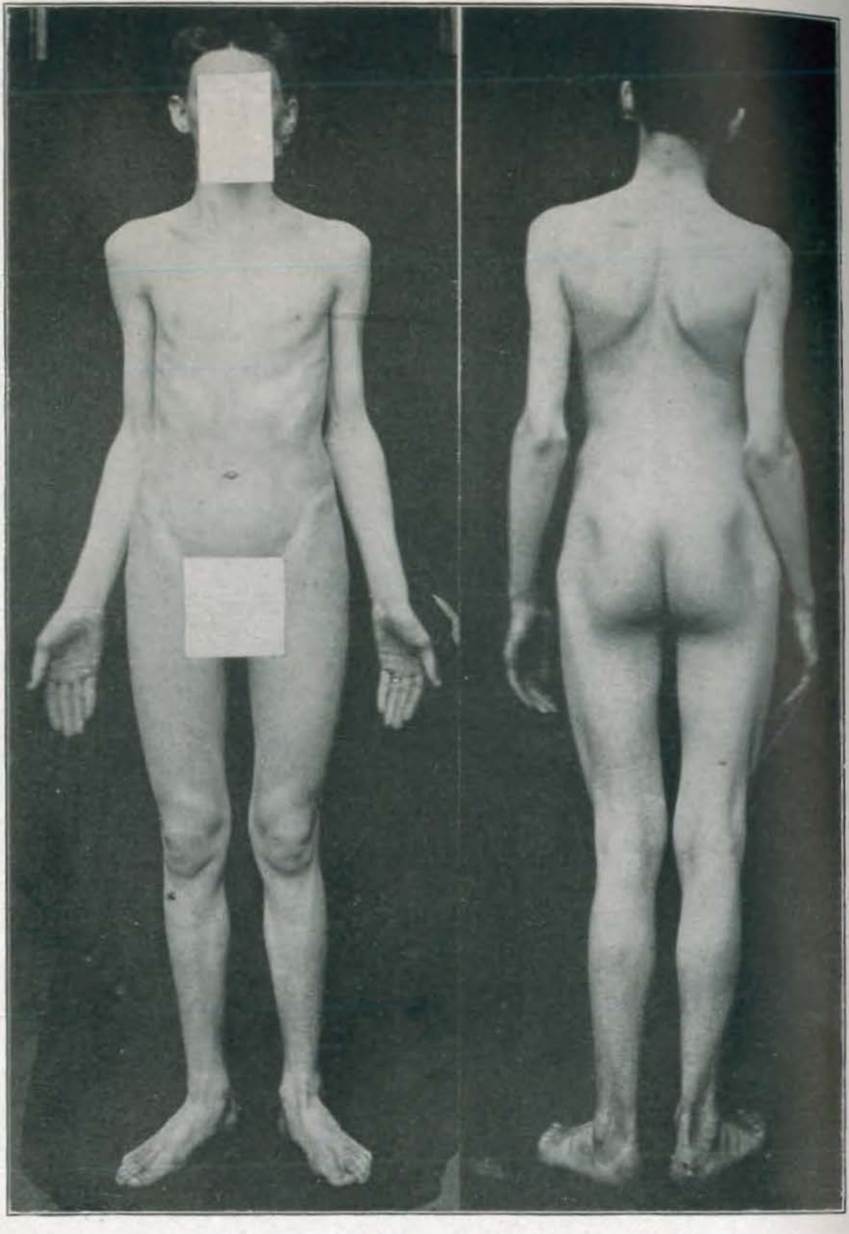
NO. 8.—UNDERWEIGHT 10 POUNDS.



NO. 2.—RAPID GROWTH.

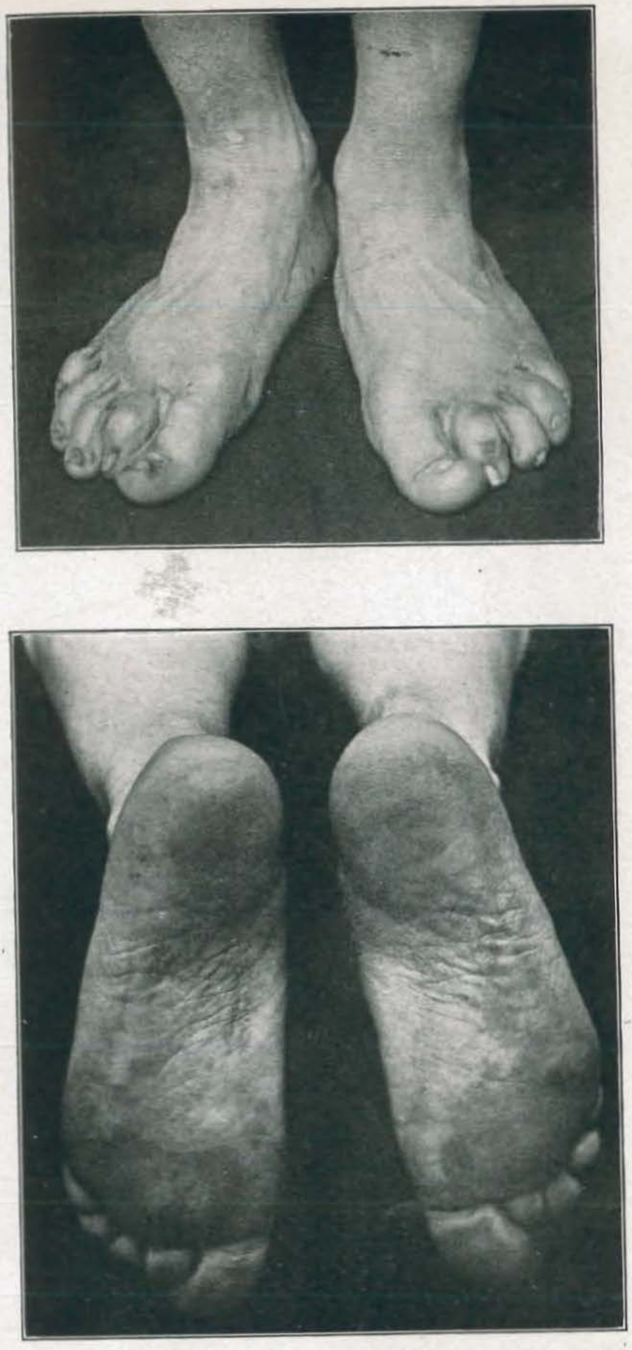
No. 8. Age, 21 years; height, 70; weight, 145 pounds. Chest measure, 34½. Chest expansion 4. Carpenter. Has worked out of doors and is muscular. General condition excellent. This is a desirable recruit for apprentice seaman in spite of his being 10 pounds underweight. Request for waiver was forwarded, and applicant was accepted by Bureau of Medicine and Surgery.

No. 2. Age, 18 years 2 months; height, 72; weight, 152 pounds. Chest measure, 34. Chest expansion, 4. Has just left high school. Works as a fisherman and helps with yachts. Health good. Not very active. Feels he has grown too fast. Accepted as recruit for apprentice seaman.



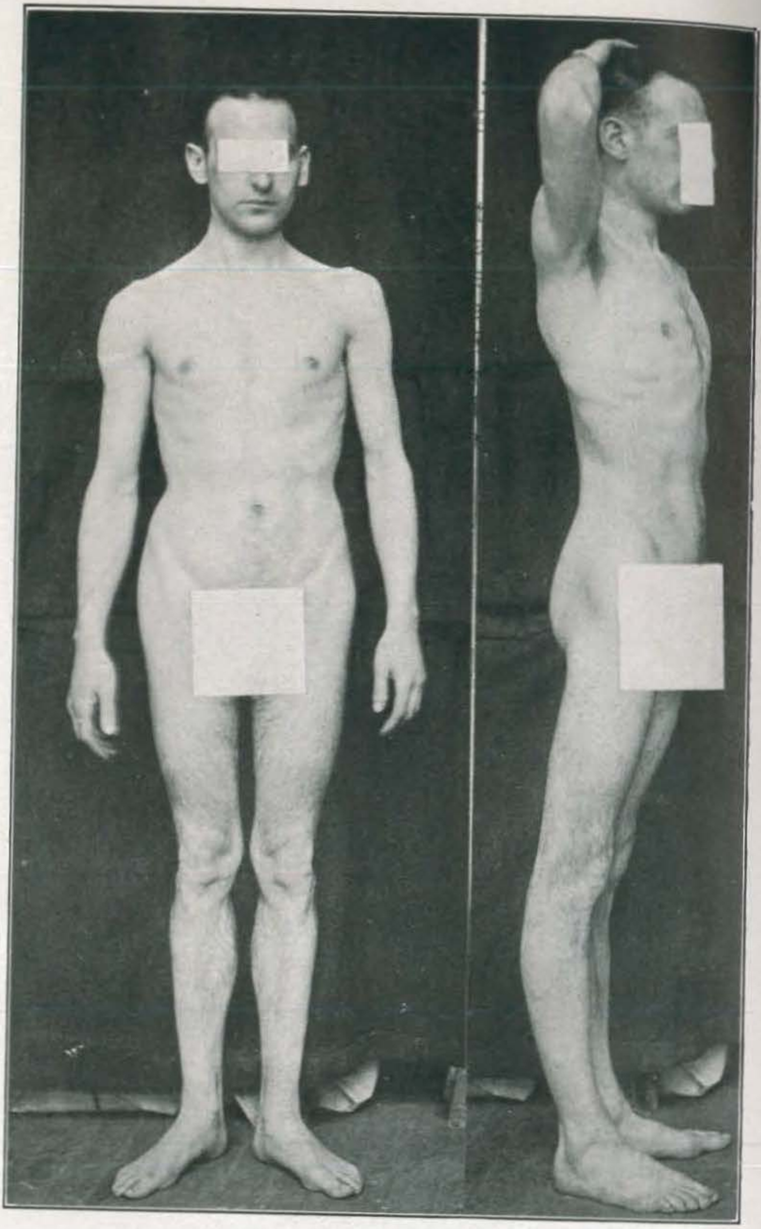
NO. 9.—POOR PHYSIQUE AND UNDESCENDED TESTIS.

Age, 18 years 8 months; height, 66⅞; weight, 124¼ pounds. Right testicle undescended. Not palpable in inguinal canal. Phimosis. Has grown very rapidly lately. Says he is strong and able to do hard work. Rejected on account of poor physique. An undescended testis which is not palpable is not a cause of rejection. Phimosis if complete is a cause of rejection.



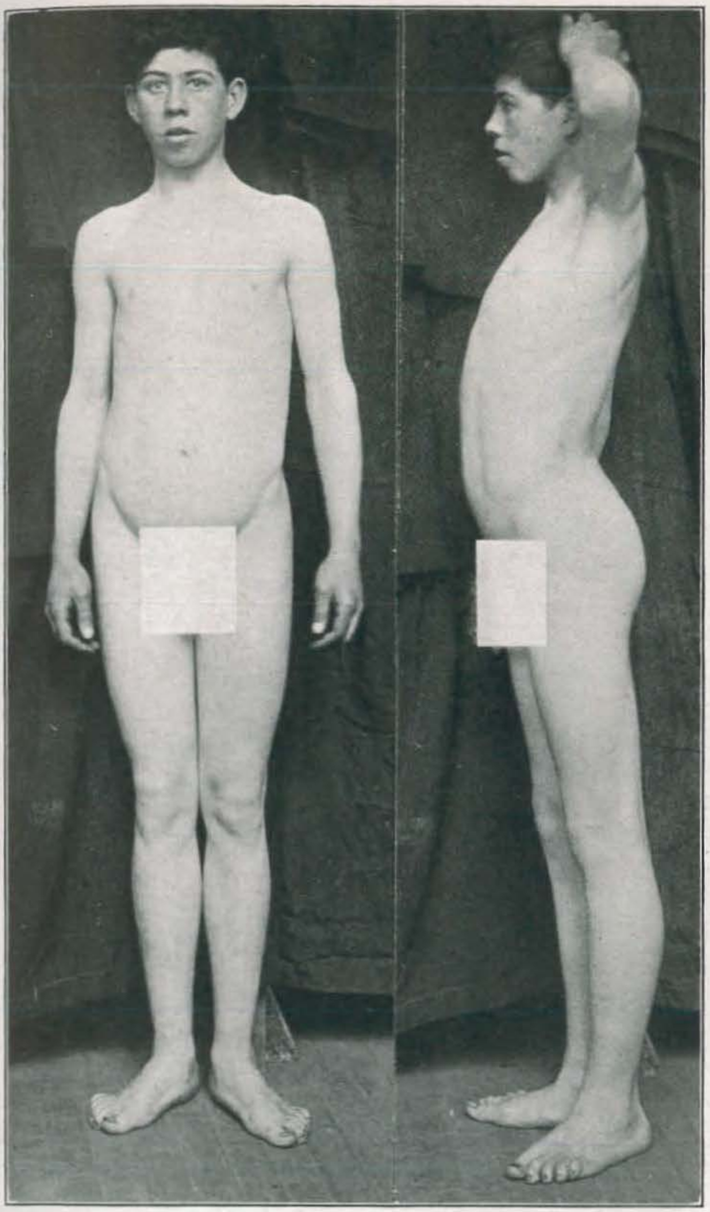
NO. 10.—HAMMER TOES.

Age, 19 years 3 months; height, 66¾; weight, 128½ pounds. General physique fair. Works as coal passer. Waiver requested.



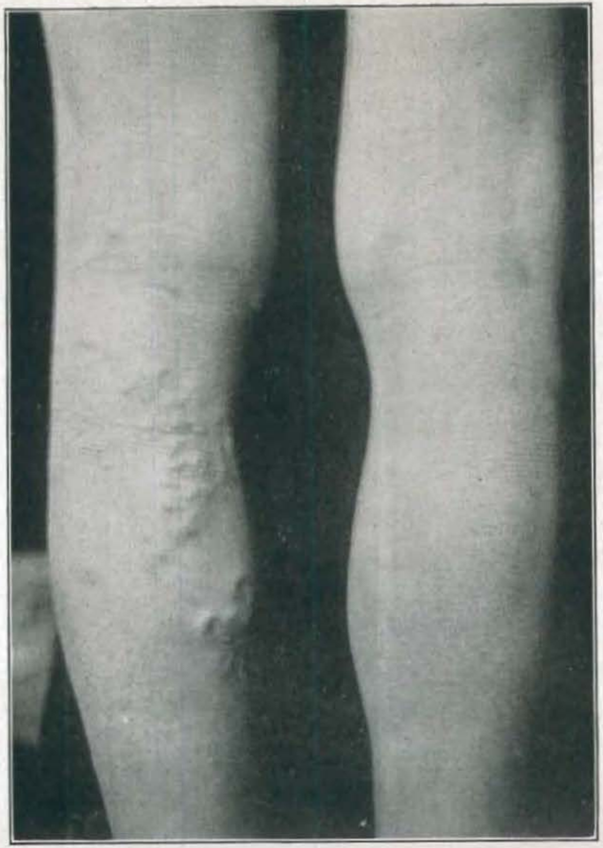
NO. 13.—POOR PHYSIQUE. PIGEON-BREAST.

Age, 25 years; height, 66⅞; weight, 115 pounds. Underweight, 19 pounds. Clerical work. Physical examination negative except for deformity of thorax. Rejected. Deformity of chest is an important cause of rejection.



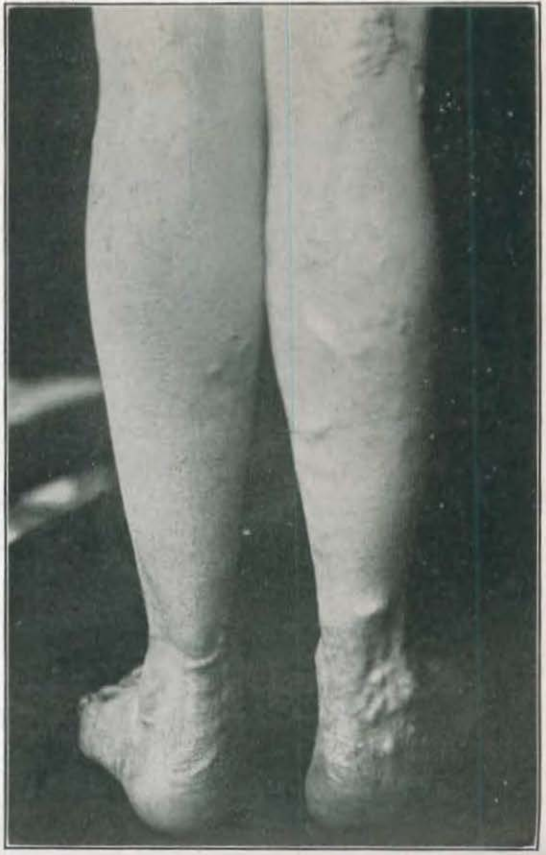
NO. 14.—POOR PHYSIQUE.

Age, 18 years 1 month; height, 67½; weight, 127 pounds. Chest measure, 32¼. Chest expansion, 2½. Mouth breather. Left tonsil moderately enlarged. Has had pneumonia twice. Physical examination of abdomen negative. Rejected on account of narrow thorax, prominent abdomen, an adenoid facies. Typical adenoid expression would be a cause of rejection in itself.



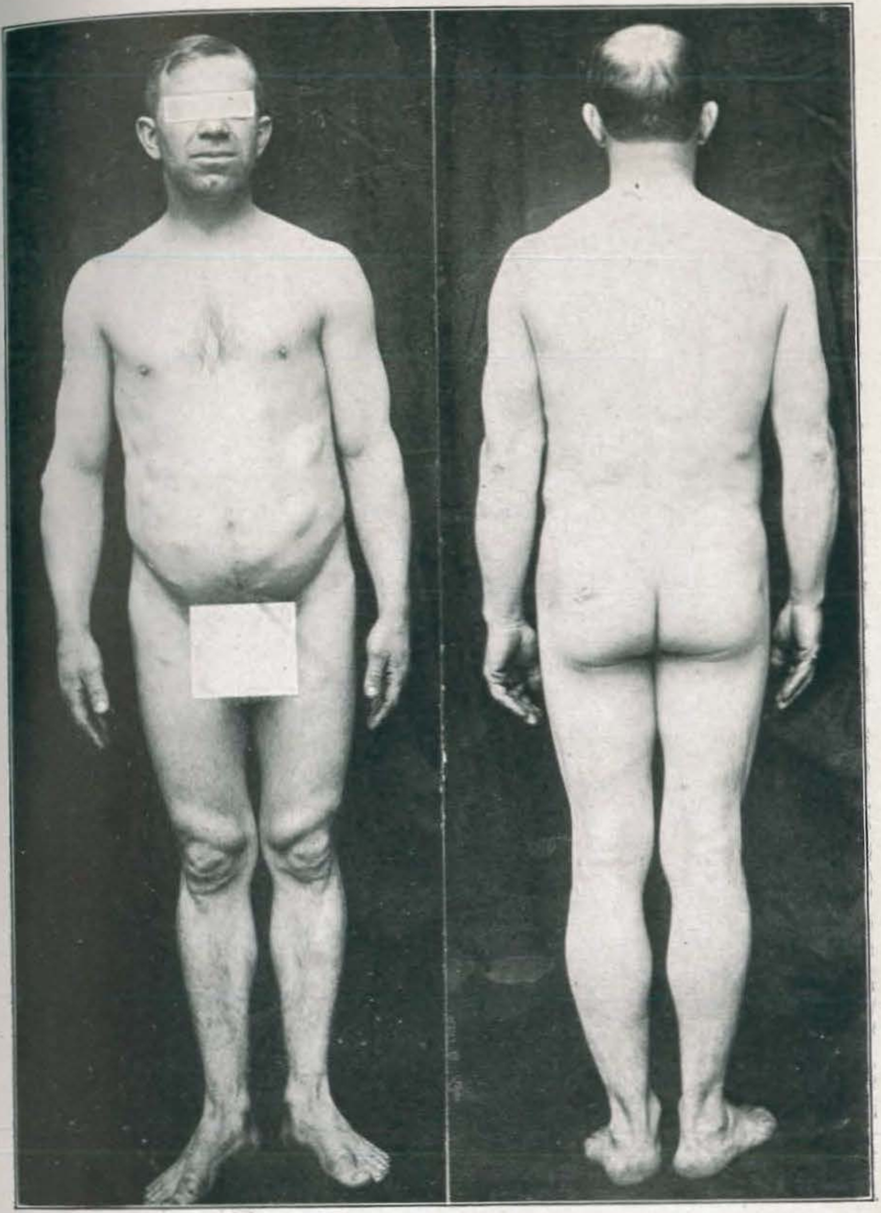
NO. 17.—VARICOSE VEINS (L.LEG).

Age, 18 years 2 months; height, 66¼; weight, 120 pounds. Has had varicose veins as long as he can remember. Stands all day working as an electrician. Symtoms denied. Rejected. Would probably develop symptoms later.



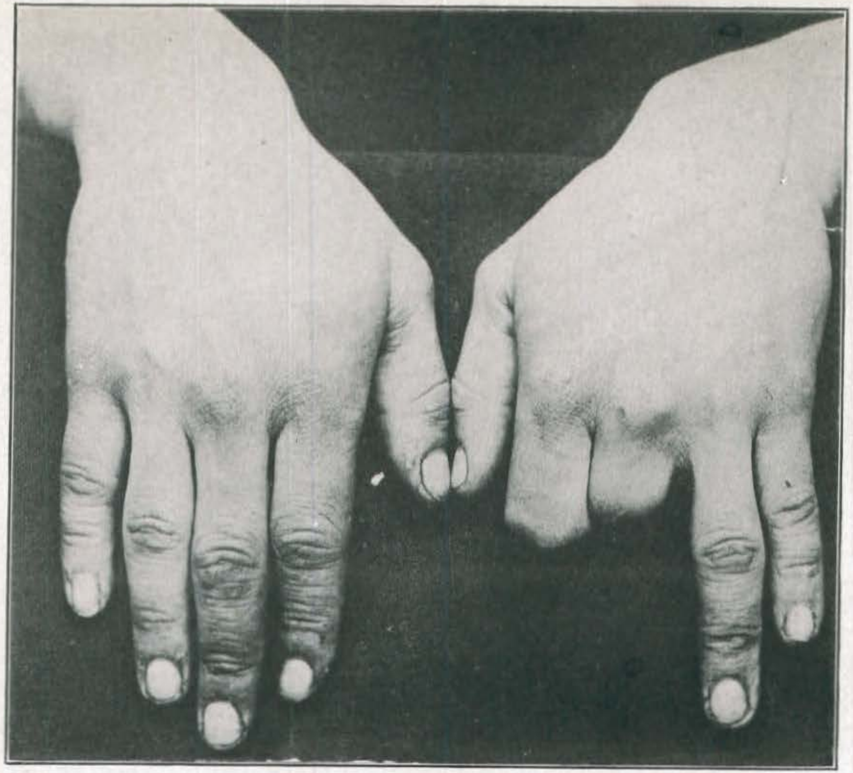
21.—VARICOSE VEINS.

Age, 19 years 5 months; height, 73" weight, 162 pounds. Symptoms denied. Rejected.



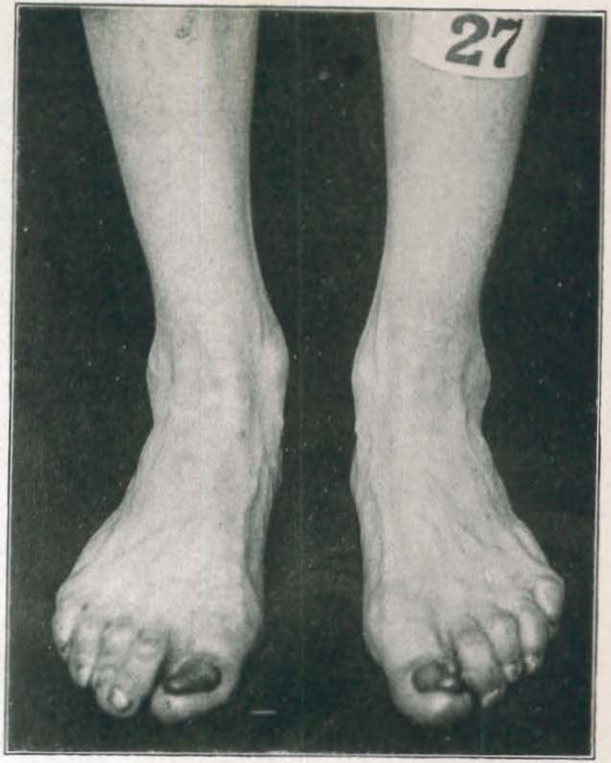
NO. 19.—MULTIPLE LIPOMATA. UNDERHEIGHT.

Age, 29 years; height, 62¼; weight, 128 pounds. Underheight, 1¾. Boilermaker. General condition good. Rejected on account of underheight and lipomata. The latter might make recruit an object of ridicule.



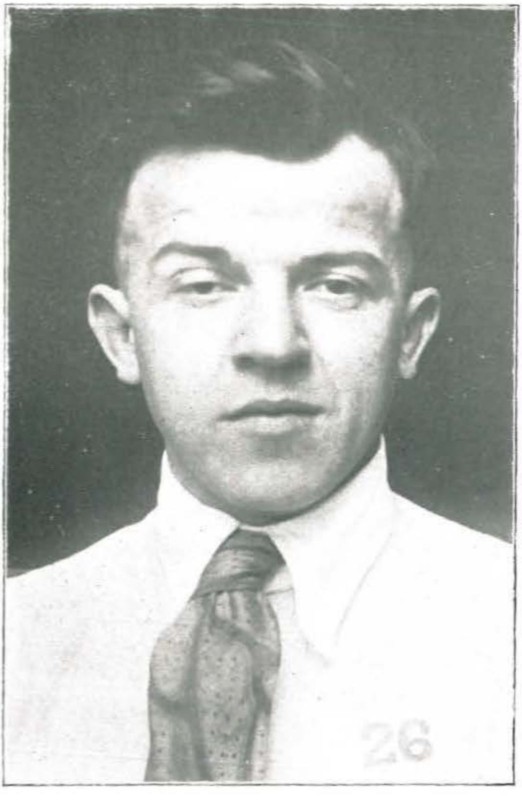
NO. 22.—LOSS OF SECOND AND THIRD PHALANGES, 1ST AND 2D FINGERS, LEFT HAND.

Age, 21 years, 9 months. Works as machinist. Lost phalanges 4 years ago. States deformity does not interfere with work. Rejected. Recruiting bulletin does not specifically reject for this disability, but in our opinion it should be a cause for rejection.



NO. 27.—DEFORMED TOE NAILS; CORNS. UNDERWEIGHT, 9 POUNDS

Age, 17 years 6 months; height, 64; weight, 106 pounds. Says he stands all day and has no pain in his feet. Rejected on account of thickening and deformity of nails of great toes. Also on account of corns and underweight.



NO. 26.—PTOSIS OF RIGHT EYELID.

Age, 20 years; height, 64⅛; weight, 128½ pounds. States that his ptosis followed a fall at 4 or 5 years of age and has persisted. Otherwise normal. No apparent disability. Wassermann negative. Vision normal. Waiver requested with photograph attached.

HISTORICAL.

EDWARD LIVINGSTONE TRUDEAU, 1848-1915.

Edward Livingstone Trudeau was born in New York, October 5, 1848. His mother was the daughter of Dr. F. E. Berger, a French physician of New Orleans, "whose ancestors were physicians for many generations, as far back as they could be traced." His father was Dr. James Trudeau, member of a well-known New Orleans family and for years conspicuously connected with the medical profession of New York.

Edward Trudeau's parents separated shortly after he was born and in time each married again. When the boy was 3 years old his mother went to live in Paris, and there he remained until after the close of the Civil War. Of his father he remembered nothing and knew little save that he had served with distinction in the Civil War, was a great nature lover and hunter and gifted with unusual artistic talent both as a painter and modeler. The former tastes led him to be absent from the city so often that his practice suffered and he made himself unpopular with many of his professional brethren by caricaturing them in plaster so cleverly that they never forgave him.

Of his early life in Paris Edward Trudeau speaks with unqualified pleasure, recalling, of bad, only the influence of the school he attended, where the morale was poor and the boys' one idea was "not to get caught." The main floor of the house where he lived was used by the French Government as quarters for one of the army generals, and Marshal Bazaine was long a hero in the American lad's eyes.

The chief pastime of the American boys in Paris at the time was to sail miniature boats in the fountains before the Tuileries, and mimic combats took place between Confederate and Federal vessels. Trudeau's boat boasted a diminutive but real cannon and a ram bow armed with the blade of an ink eraser, which played havoc with the shipping of friend and foe alike. During the visit of Mason and Slidell the patriotic fervor of the Northern sympathizers among the boys waxed strong and led to a concerted demonstration against Mr. Slidell when he walked in the park. Trudeau went so far as to fire a hard putty ball from his catapult at the old gentleman, hitting him in the back. There were the usual calls to "run" which emanate from sympathetic bystanders on such occasions, but Mr. Slidell collared the young culprit, who only escaped a severe drubbing by squirming out of his coat and running home in his shirt sleeves. That night he was lionized at the American Embassy and introduced to Mr. Dayton, the American envoy, as the boy who had attacked the Confederate deputy on neutral territory.

When Trudeau was in his eighteenth year he was sent back to America. He was astonished at the pleasant and easy terms of intimacy on which young men and women associated in this country and soon fell into his country's ways and had an abundance of sweethearts. There had been equal astonishment on the part of his girl cousins at the young foreigner's ways and ideas and he convulsed them with the declaration that "Ze English language is a very hard language to prononciate."

While Edward's older brother went at once into business he himself entered a preparatory school at Newport, where the *Constitution* and the Naval Academy then were, with a mind to becoming an officer in the Navy. His brother's health put an end to ambition along these lines and soon he was back in New York devoting himself assiduously, lovingly, to the care of his brother, the victim of a rapidly progressive type of consumption. There were no trained nurses to be had in those days and young Trudeau played the part of nurse to the best of his ability. The brothers occupied the same room and the same bed from the incipiency of the disease until the death of the elder Trudeau. "The doctor called once a week to see him and usually left some new cough mixture, but the cough grew steadily worse. Not only did the doctor never advise any precautions to protect me against infection, but he told me repeatedly never to open the window, as it would aggravate the cough; and I never did, until toward the end my brother was so short of breath that he asked for fresh air. I shudder to think what condition that room must have been in. Even my vigorous young body, during the last month of my brother's illness, began to show the ill effects of the constant confinement and the prolonged mental and physical strain. How strange that, after helping stifle my brother and infect myself through such teaching as was then in vogue, I should live to save my own life and that of many others by the simple expedient of an abundance of fresh air."

The brother's illness and death was the first introduction to tuberculosis and death. "Little I knew then how many hundreds of such death-bed scenes I should attend in years to come, in a life which has been spent in the midst of a perpetual epidemic of tuberculosis. It was my first great sorrow and I have never ceased to feel its influence. In after years it developed in me an unquenchable sympathy for all tuberculosis patients. * * * I love to think that my work has been in a measure a tribute from me to the brother I loved so well."

The loss of his brother made a deep and lasting impression on young Trudeau, for they had been devoted and inseparable companions, and his relatives and friends exerted themselves in vain to console him. It was only in the rectory cottage at Little Neck, "inhabited by the saintly old clergyman and presided over by his charming daughter who helped her father with his parish work, played the organ on Sunday and was beloved by the rich and poor of the neighborhood far and wide," that his lacerated heart found some alleviation of sorrow.

About this time occurred a rupture with the grandmother with whom he lived. It was over a trifling matter but the pertinacity and determination of the frail youth showed itself at once. Though without means of subsistence and entirely dependent on the old lady, he left the house, vowing never to receive a penny from her again. A truckman hauled his trunk away and together they trudged about from street to street until young Trudeau found a suitable hall bedroom on the fourth floor of a house on Eighteenth Street. Later, pleasant relations were resumed with his grandmother, but he never again consented to receive any financial aid from her, though he was often in great need and assistance was pressed upon him.

One must conclude from Dr. Trudeau's own words that at this period he was a somewhat dissipated, rather worthless young man, though a lovable one. When in 1868 he decided to become a student in the College of Physicians and Surgeons, a friend of his at the Union Club offered to bet $500 he would never graduate, and no one was found to take the bet. "The requirements for a medical student in those days were of the simplest. There was no entrance examination. All the student had to do was to matriculate at the college and pay a fee of $5, attend two or more courses of lectures at the college and pass the very brief oral examinations which each professor gave the members of the graduating class in his own subject. In addition, the law required that every student enter his name with some reputable practicing physician for three years as a student in his office, a rather hazy and indefinite relation for which he paid the physician $100 each year. If these requirements were met, the long-hoped-for sheepskin was forthcoming and the new M. D. was turned loose in the world to meet as best he could the complicated responsibilities of a medical career."

Teaching in those days was largely didactic. Pathology was a side issue and no microscopic laboratory studies were required. Dr. Alonzo Clark taught that tuberculosis was a noncontagious disease, due to humors and various types of inflammation and to constitutional peculiarities. But he had sound notions of therapy and advised Trudeau, who consulted him about a friend with symptoms of tuberculosis, to send his friend to the mountains to drive a stage for a few years.

In January, 1871, Trudeau was appointed interne in the newly erected Strangers Hospital on Tenth Street, and in June of the same year he married Miss Beare, whom he had long loved and courted at Little Neck. Soon after the wedding they went abroad for an extended tour. It was while in England that he had his second warning of tuberculous infection, but he heeded it as little as the first. Later, while living in New York, he had occasional attacks of fever, which everyone told him was due to malaria. Finally, his health became so depreciated that he consulted Dr. Janeway, who informed him that the upper two-thirds of the left lung were involved in an active tubercular process. A trip to the South brought no improvement and the young couple, now expecting the birth of the second child, were in a serious quandary as to what to do. Eventually he gave up work and went to the Adirondacks, a section of country at that time only frequented by hunters and fishermen and viewed with disfavor because inaccessible and having a supposedly severe and trying winter climate. Trudeau, with his intense love of outdoors, of riding and hunting, was not deterred by these features and stayed there at Paul Smith's tavern from May to September, and then spent a winter in Minnesota. Residence in St. Paul so disagreed with the patient that he moved to the Adirondacks early in June to spend the summer and winter, taking wife and the two young children with him. It was a wild and daring project when one considers the remote and inaccessible character of the home chosen, 60 miles from the nearest physician.

Later the Trudeaus moved to Saranac Lake, where they remained, off and on, for the greater part of 40 years. There he finally began to gain in weight and strength and slowly resumed the practice of medicine. Patients came to him there, tuberculosis cases sent by Dr. Loomis and others in New York, and gradually the place began to build up. Soon a little chapel was built for the growing community. In 1880 a gun club was formed, then a hotel was built. It was not until 1885 that the first cottage of the Adirondack Cottage Sanitarium was occupied.

Meanwhile Trudeau's thoughts had been increasingly fastened on the subject of the etiology of tuberculosis. Koch's famous and epoch-making paper on this topic and the article on the subject in Loomis's New Practice of Medicine put Trudeau in a fever of eagerness to investigate and verify the postulates therein set forth. He was not deterred by his complete ignorance of bacteriology, and went to New York determined to master the technique of staining and identifying the new bacillus. After considerable effort he succeeded in securing the necessary laboratory facilities, and in time became proficient as a microscopist in all the details required for his special field of work.

"It is curious," writes Trudeau in his autobiography, "how slow physicians were in this country to accept Koch's discovery or realize its practical value in the detection of the disease. As late as in 1890 a young Columbia College rowing man came to Paul Smith's for a troublesome cough he could not throw off, and I detected the bacillus on the first examination and told him he had tuberculosis. He smiled and said I must be mistaken, for he had rowed a good race on the crew that spring and had just been insured by two of the best insurance companies in New York for a large sum."

There is no more interesting chapter of his life than that which describes the installation of his own laboratory at Saranac and his early experiments and demonstrations and the published results. In May, 1887, Trudeau read a paper entitled "Environment in its relation to the progress of bacterial invasion in tuberculosis" before the American Climatological Association, in Baltimore, or, rather, he had it read for him by Dr. Loomis, as the journey to Baltimore in June and one of the frequent recurrences of his lifelong disease made it impossible for Trudeau to stand on the platform. In May, 1910, Trudeau made his last public address, as president of the Congress of American Physicians and Surgeons, at the meeting in Washington, though ill and miserable with fever at the time.

It was in 1887 that Robert Louis Stevenson, accompanied by his mother and Lloyd Osbourne, came to Saranac Lake and that a deep and abiding friendship was established between two natures that had much in common.

Between 1889 and 1894 nine new cottages were added to the sanitarium. Money for these structures was obtained largely by donations by wealthy friends and patients of Dr. Trudeau, who had a marvelous gift of strongly attaching to himself those with whom he came in intimate contact. Soon an infirmary was put up, a recreation room, a training school for nurses, and finally, erected by the liberality of former patients, a reception home for the type of advanced cases which had previously been denied admission to the sanitarium, because its aim and object was to obtain curative results. For this principle of administration Dr. Trudeau had been bitterly criticised by physicians who thought he was merely trying to make a personal reputation for cures by treating only selected cases. "Through all those years, when I examined applicants for the sanitarium the hardest thing I had to do was to refuse patients admission; but I persisted in so doing, because I knew that the opportunities which the institution afforded for restoring the tuberculous to any degree of health would be wasted unless discrimination and skill in the selection of the cases were exercised."

The reception home was followed by the erection of more cottages, homes for the medical staff, a medical building with ample equipment for radiology, etc., examining rooms and library, and a nursing home. Meanwhile the endowment fund had been slowly growing and in 1914 it reached the sum of $600,000.

For the first six years of the sanitarium's existence at Saranac, no notice was taken of it. In 1891 Dr. V. Y. Bowditch opened his similar institution at Sharon, Mass. In 1895 a committee of the State Legislature of Massachusetts reported favorably on the methods of treatment and the results obtained at Saranac and funds were voted for a State sanitarium on similar lines. By 1909, 352 private and State institutions were in operation, of which 102 had sprung into existence during that year.

These crude and random references to the main incidents of Trudeau's life give no idea of the charm of his autobiography, from which they are drawn, and no conception of the lovely character which beams forth like a shining light from the chronicle of daily duties. This book should be read by every medical man and by every traveler on the hard road of life, who would find inspiration to endure and power to conquer in the struggle. Trudeau had imagination and a hopeful temperament, invaluable possessions for a pioneer in any profession. Without these qualities he would never have conceived and carried to completion the scheme of outdoor treatment in the wilds of the mountains, an enterprise regarded in that day as both startling and hazardous.

Apart from his accomplishment in a new line of treatment for consumption—up to the time of Trudeau, Brehmer and Dettweiler in Germany had the only institutions of the kind in the world—Trudeau must be remembered for the lesson of fortitude and patience, for the example of a heroic endeavor against huge handicaps which he has left to his country and to the world.

A lifelong invalid, a great sufferer, Trudeau presented in himself a wonderful illustration of the triumph of mind over matter, of the victory of a strong and valiant spirit clothed in a frail and perishing body. Death was ever threatening him; death was around him all his life; it snatched from him the tenderly loved brother, the beautiful daughter, the son in whom he delighted and yet Trudeau, ever happy and fun loving, was able to forget his own afflictions through unremitting labor for others. In the great school of experience he was a docile and willing pupil, and the development of a singularly beautiful character gave fresh illustration to the truth that "whom the Lord loveth He chasteneth." Like the martyrs of old, he "climbed the steep ascent of heaven, triumphant over pain," that he might "follow in His train." (ED.)

EDITORIAL.

OUR DUTY TO SYPHILITIC PATIENTS.

An eminent authority on tuberculosis recently made the statement that no large reduction of this widespread scourge could be hoped for in this country until it became possible to convince the tuberculous of the nature of their condition during the incipiency of the disease. How to do this is a difficult problem. It can be readily appreciated that the head of a great business concern will be loath to drop everything and seek the benefit of treatment in a sanitarium or go to a distance in search of an equable climate on the strength of mere laboratory findings in the absence of distinct subjective symptoms of serious disability. How much stronger is this disinclination to give up in the case of an humble wage earner with a dependent family or where the mother of several children believes her presence at home is indispensable to their welfare!

But if the hope of cure in tuberculosis rests on early diagnosis and, through the cooperation of the patient, on early and efficient handling of the case, how much more is this true of syphilis. Here, too, we have the necessity for a radical change in the patient's mode of life, for sacrifice, self-denial, courage, perseverance and all this, in most cases, without distinct objective indications to him of the gravity of his condition.

The effective treatment of syphilis in the Navy to-day presents difficulties which have always existed, in a measure, due to the foibles and weaknesses of human nature, while on the other hand, paradoxical as it may seem, added difficulties have grown out of the more exact and scientific methods of medication now in vogue. In former times syphilis was more often characterized by conspicuous, precocious lesions. Unfortunate results from injudicious treatment were more common. The subject of venereal disease and its sociological features were not matters of public discussion, but were shrouded in mystery and horror. The conscientious physician, trying to discharge his duties in the highest and worthiest manner, had not only to prescribe ponderable remedies but to combat the doubt, the anxiety, the despondency, the alarm aroused by his diagnosis and advice.

To-day we have to deal with a malady which has lost much of its terror for the public, because the public recognizes the vast advances of medicine toward attaining a scientific plane and honestly believes that the faculty possesses in salvarsan an expensive but easy, prompt, and infallible cure; because, while the profession is constantly ascribing to syphilis a larger and larger rôle as an etiological factor in other diseases, the clinical manifestations are less and less striking to the patient, thanks to treatment through generations of previous syphilitics and to treatment in our own day begun before the secondary stage has brought conviction home to the victim himself.

If an early diagnosis has been made, and how anxious we all are for an early diagnosis, and been followed by careful but intensive treatment, a few months or even a few weeks suffice to produce in our patient changes that we are far from desiring. As hope, well-being and vigor succeed anxiety, malaise, and weakness, as the patient waxes fatter and sleeker we might expect to have him come to us grateful for what has been accomplished, convinced of his adviser's acumen, vowing to carry out his smallest suggestion to the letter. Alas, how rarely is this the case. When the patient who perhaps at first received the diagnosis with considerable reserve, finds himself happy and apparently well, when he realizes that the horrors conjured up by his fervid imagination were unfounded, that the representations of quacks, nostrum labels, and dime museums do not apply to him, his previous humility is replaced by an attitude of scepticism, superiority, and indifference. He decides that the doctor has made a mistake, a great mistake, involving injustice to himself and proving that doctor unworthy of confidence in the future. He has perhaps discussed things with the various sea lawyers and wiseacres that abound on the berth deck and provided himself with a diagnosis more acceptable to his pride and more conformable to the facts as he sees them. He may have but a poor opinion, too, of Navy doctors and hold that they are unduly disposed to make a diagnosis of syphilis in enlisted men. Even where the patient esteems his doctor and possesses more than the average intelligence, a reasonable and honest doubt may well persist in his mind as to the correctness of the pronunciamento.

Let us review the sequence of events and attempt to put ourselves in the position from which he views the situation. About two months after his last lapse from virtue, for some time he has been making commendable efforts to be continent, he notices a small abrasion on the penis, which he ascribes, rather pardonably, to friction from a new, tight-fitting pair of dungarees. He has no thought of the possibility of venereal infection, owing to the long period intervening since the last opportunity for infection. He washes the sore and secure in the conviction that it is nothing serious does not greatly concern himself about the absence of prompt healing. Some weeks later, after a succession of hard steaming watches, marked by unusually strenuous labor, he begins to suffer slight inconvenience from a swelling in one or both groins. The disability is ascribed to "strain," and though observed with interest, excites no suspicion of a serious condition. It is the spring of the year and the incidence of a heavy cold merging into sore throat does not seem strange or a phenomenon to be associated with previous developments having no apparent genetic connection with each other. Let us add that the heat and work in the fireroom and an acne of long standing have prepared this man to neglect serious consideration of painless and seemingly trifling disturbances of the skin. Following on the sore throat, however, there is a period of such weakness and disinclination to work that our imaginary case decides to attend sick call with a view to being excused from duty. An accommodating hospital corpsman had previously supplied a gargle, which rendered a visit to the doctor unnecessary.

During the rush of business that marks morning sick call on a large battleship he is hurriedly examined. A diagnosis of syphilis is made, he is told that a long course of treatment is needed, assured that he will not die, given summary directions about his general health, and as the ship is to sail on the morrow is hurried away to the hospital. There he receives a course of salvarsan and mercury injections after the usual Wassermann, etc. Thanks to a good constitution, to good food, to the constant supervision of all the details of life and conduct which is maintained over the enlisted men in our service and to the intensive treatment received at a reasonably early stage of the malady, a half year or more may now elapse without a single manifestation of syphilis.

Standing on the plane of such a man, assuming his mental limitations, his ignorance, his inexperience, can we wonder if he becomes skeptical as to the soundness of the diagnosis and predictions delivered in his case? It is only required, now, that he hear that a Wassermann test of his blood was negative for him to pass into the class of the unreclaimable and incurable. The judgment of his senses is all against accepting what he was told by the doctors who have treated him. By accepting this testimony he is justified in shunning the doctor, escaping further therapy of a painful or disagreeable nature and the annoyance of constant attendance at sick call, not to mention the possibility of detention aboard whenever he has a sore mouth or throat. He can escape, too, the burden of a constant surveillance that makes him disagreeably conspicuous among the crew. In a word, everything inclines him to believe what he wants to believe, and encourages him to keep out of sight.

In concluding our study of the enlisted men's viewpoint we must remember that the conviction is widespread and deep rooted among them that a few "shots" of salvarsan are *curative;* that a Wassermann has therapeutic value; that a single negative Wassermann is full justification for the discontinuance of treatment as representing a cure.

It would be a crime against the fundamental code of the profession for a surgeon to allow his treatment of a case to be affected by the foolish muttering of delirium or the passivity of coma. An injured man's ignorance of his condition or his indifference to his surroundings constitutes only one more appeal to the surgeon to deploy all his talents for the salvation of the stricken one. How much more should the ignorance, stupidity, and prejudice of a syphilitic create an imperative call for the physician to exert his utmost effort to supplement the patient's deficiencies from his own store of knowledge and experience. Surely the routine and careless management of a case of syphilis has far less excuse than an error of diagnosis or treatment in some rare and difficult case which excites general interest by reason of its dramatic qualities and which, if properly handled will redound to the credit of the attendant. The number of syphilitics is large, the disease involves the entire organism, perhaps for life, and its baneful influence may extend not only to others of the present generation, but to the unborn of succeeding ones.

The young and enthusiastic medical officer, busied with countless details that each day insistently demand his attention, eager to do surgery or interested in some special line of research, may unintentionally neglect the chronic syphilitics in the crew who are only too glad to abstract themselves from notice. A few disappointing, humiliating experiences with headstrong, unappreciative, supercilious patients may have made him a pessimist in regard to the value of painstaking, personal endeavors for the syphilitic.

This is a plea for the medical officer to regard every chronic syphilitic as a potential case of fracture, of paralysis, of blindness, lameness, insanity; a plea for the bestowal on the chronic of that earnest, assiduous attention which is unfailingly given to acute cases where immediate calamity is more readily sensed; a plea for that prompt, early and assiduous indoctrination of the syphilitic in the early stages which alone can save him from the snares and pitfalls that beset the long and difficult road to cure.

The bureau has had these various considerations regarding the proper treatment of the syphilitic in view in preparing and issuing the new syphilitic abstract originally suggested by Passed Assistant Surgeon G. F. Cottle, United States Navy.

NEW PREPARATIONS ISSUED BY THE MEDICAL SUPPLY DEPOT.

The therapeutic measures developed or made conspicuous so far by the war are two; the antiseptic treatment of wounds by the liberation of chlorine and the protection of burned surfaces by films of wax-like material. With the former idea the medical public has for some time been familiar though only lately have all the steps in the procedure been fully understood.

The so-called Carrel-Dakin treatment involves first of all a careful determination of the available chlorine in the cloride used for making up the solution. In the next place the solution must be most accurately neutralized and finally a technic of application is required which will maintain intimate and prolonged contact between the tissues and the solution itself.

That the successful preparation, ex tempore, of an active, nontoxic solution according to the Daufresne-Dakin technic is not an easy matter for the medical officer of a ship will be readily conceded by any one who has tried it. Of the handicaps and limitations involved, it is sufficient to mention the difficulty of weighing accurately except when a ship is at anchor in port and the frequency of the occasions when fresh chloride of lime can not be obtained.

Passed Assistant Surgeon W. A. Angwin, United States Navy, has recently reported a very significant series of analyses of samples of chlorinated lime from which it was proposed to make up the Dakin fluid. Some of the samples were from ships' stores, others from retail drug stores, others from hospitals. Owing to age or other causes of deterioration only 1 of 11 samples contained enough chlorine to yield a satisfactory preparation. It may be added that Dr. Carrel himself, writing in the Journal of the American Medical Association, required nearly half a page of fine print to describe in succinct scientific style the steps in the preparation. On board ship we have had good results from the famous fluid, but again when efficient therapy was particularly indicated it gave negative results. Where it fell short of our expectations it was clear that through unavoidable errors in calculations and manipulations we had not succeeded in obtaining the specified solution.

It is in view of what has been said that the bureau has decided to issue to the service a preparation known in America by the trade name of chlorazene. This is a white, crystalline powder with faintly chlorous odor and a characteristic bitter taste, soluble in 1 to 8 parts of water. It has no direct corrosive action on the tissues, does not precipitate or coagulate protein, and is practically nontoxic, even when injected hypodermatically. Its reputed phenol coefficient is 54. It is used surgically in solutions of 1 and 2 per cent, unless the infection is one of great virulence. When stronger solutions are required, the skin edges should be protected by smears of vaseline. Oily preparations are not stable, but a very elegant jelly has been obtained by combining it with sodium stearate. Chlorazene gauze made with a 4 per cent solution is highly spoken of. Chlorazene attacks iron, copper, and brass readily, but has a scarcely appreciable action on silver, nickel, and aluminum. Chemically the substance is a paratoluene-sodium-sulphochloramide. The employment of this substance is due to the associated researches of Dr. H. D. Dakin and Prof. J. B. Cohen.

When we pass to the consideration of the film protection of burns, we are confronted on the one hand by a few simple facts and on the other by a fog of mystery and uncertainty. The exact composition of the original ambrine remains unknown to the profession at large, but substitutes and apparent equivalents for it, reputed to give highly satisfactory results, may be prepared by any one disposed to experiment with a variety of solid hydrocarbons.

The originator of the treatment by protective films is Dr. Barthe de Sandfort, of Issy-les-Moulineaux. Dr. de Sandfort was once a sufferer from a painful form of rheumatism. After a course of treatment at Dax, where the mud baths gave him great relief, he gradually evolved a hot topical application for use on his joints at home. It consisted of melted paraffin mixed with the resin and oil of amber. Later, when working in China in connection with the construction of certain railways, he had occasion to treat a number of Chinese patients suffering with severe burns. He used his ambrine with the most signal success. When he reported the cases, his confrères laughed at him.

Returning to France in 1904 he related his experiences with the new treatment and was again received with ridicule. Early in the present war the doctor placed himself and his remedies at the disposal of the war department, but received no encouragement. Convinced of the value of his methods, however, he sought every opportunity to use them in the relief of the victims of the newer war measures, and so brilliant and conspicuous were the results obtained that at last his therapy has compelled the attention of the world. Ambrine is now on the market as a proprietary article of secret composition, though it is generally conceded that the principal constituents are paraffin, oil of sesame and certain resins.

Lieut. Col. A. J. Hull, Royal Army Medical Corps, made an extended study of de Sandfort's treatment and recognized its enormous value. He followed his observations by experiments with various medicaments incorporated in hard and commercial paraffin and section wax. He determined that when hard paraffin of suitable melting point was treated by superheated steam its melting point could be reduced 2 degrees centigrade and it then acquired the mechanical properties which gave ambrine its chief value. He considers the addition of antiseptic and stimulating substances desirable. Tar was unsatisfactory as an ingredient and likewise potassium sulphate. His final output, "paraffin No. 7," he regards as in every way the equal of ambrine. The formula is as follows:

(a) Resorcin	1 per cent.
(b) Eucalyptus oil	2 per cent.
(c) Olive oil	5 per cent.
(d) Paraffin molle	25 per cent.
(e) Paraffin durum	67 per cent.

Melt e and add d and c. Dissolve a in absolute alcohol (soluble 2 in 1) and add the alcohol solution. When the preparation has cooled to 50 C. add b.

A somewhat cheaper preparation is obtained by substituting 0.25 beta-naphthol for the resorcin.

The beneficial action of the paraffin applications is largely mechanical. It protects the burned surface from the air, reducing pain; it protects from irritation the new granulations so often detached or destroyed by the manipulations incident to the older dressings; it acts like a splint to the damaged tissues. In addition, the heat used in its application has value, encouraging the flow of lymph, soothing the nerves and affecting the circulation of the part.

The paraffin products, whatever their exact formula, are all applied in the same manner. Reduced to fluidity by heat, they are spread on with a broad camel's-hair brush or sprayed on by a specially constructed apparatus. The latter would be the ideal method if the sprays did not require to be maintained at a definite temperature and were not prone to get out of order. The use of a spray apparatus probably saves time and is more agreeable to a single patient, but when a large number of injured men have to be attended to with dispatch, as after a serious accident on board ship, the use of the brush is simpler and would probably save time in the end.

Over the first coating of protective a very thin layer of absorbent cotton is applied. This is in turn covered with paraffin and a second layer of cotton and the parts are lightly bandaged. Before the application of the paraffin the wound is cleansed (as with the Dakin fluid or its equivalent), dried by lightly pressing over the entire surface with a broad sheet of sterile gauze or, better, by the use of an electric drier. Where the burn is very extensive and involves the more movable regions, three or four layers of cotton and paraffin may be used.

The wax should be removed at least once a day and a fresh dressing applied when the wound secretes or suppurates very freely. Great care should be used, lifting the films in large scales and sheets.

Dr. Torald Sollmann has published interesting reports of his extended experiments with paraffin and other protective films, intended not to imitate or reproduce the French preparation, but to enlarge the field of available material on the same general lines. He brings out the following points:

The harder the film the greater the protection.

The softer the film the greater the comfort derived from it.

The film should be both ductile and pliable.

The melting point of the film should be between 48 and 53 C.

The substances used for experiment included petrolatum, Venice turpentine, stearic acid, spermaceti, cacao butter, resina, olive oil, yellow wax, beeswax, asphalt, Japan wax, castor oil. Many of the films produced were crumbly and either too soft or too hard. Various films made from different grades of paraffin without the admixture of any other substance gave promising results. The report on "parresine" is favorable. Dr. Sollman found this soft but reasonably coherent and very much like ambrine, but slightly more brittle. One of the combinations showing the greatest pliability consists of paraffin and asphalt in proportions varying from 1 to 3 per cent.

It is the preparation known under the trade name of "parresine" that will be issued on requisition from the naval medical supply depots.

NOTE.—References: Jour. Am. Med. Assn., April 17, 1917; Jour. Am. Pharm. Assn., April, 1917; New Orleans Med. and Surg. Jour., April, 1917; Brit. Med. Jour., Jan. 13, 1917; Interstate Med. Jour., April, 1917.

KEEPING IN TOUCH WITH CASES TRANSFERRED FROM THE SHIP.

The following suggestions from Surg. E. G. Parker, United States Navy, arrived after the copy for the new edition of the manual had gone to press: "Medical officers transferring interesting cases to a naval hospital feel great interest in the subsequent history of these patients. Directions should be introduced in the manual whereby this information might be sent out by the naval hospital to the medical officer concerned in all cases except those following a stereotyped course. For example, a slip embracing diagnosis, unusual developments, autopsy findings, etc., would give valuable instruction and information to the medical officer who first handled the case."

Every doctor serving on board ship must have regretted on more than one occasion that through the duty of putting his patient under the most favorable conditions for recovery, these are naturally to be found in a hospital on shore, he must lose touch with the case and miss the valuable lessons to be derived from watching and studying it to the end. The transfer of important cases ashore often reduces one's clinic to the level of a dispensary and except for the occasional accident at sea one has little to treat but the ephemeral and relatively trivial.

While, of course, it is always permissible to address the commanding officer of a hospital or a member of his staff whom one knows personally for information regarding an important or obscure case, so many transfers are made on the eve of sailing or when an unexpected opportunity offers that the request may not reach the hospital until long after the case has been disposed of and so involves digging up a completed record.

An ideally simple way of handling this proposition would be to have future hospital tickets printed with a detachable perforated slip containing printed questions for answer. When no special interest attached to a case this slip could be torn off. When left on the slip would be a request prepared for ready reply from the hospital and reducing to a degree the clerical work at that end.

In the meanwhile the editor suggests that medical officers anxious to follow up their cases have printed on board ship small cards modeled on the following, which could accompany the ordinary transfer papers unofficially:

[Please return, filled out; to medical officer, U. S. S. ....]

JONES, E. R. F. 1. C. *Calculus in bladder.*

Diagnosis confirmed, Yes...... No........

Diagnosis changed to..

Operation...

Final disposition..

Remarks...

....

....

With thanks,

A. E. S. CULAPIUS,

P. A. Surgeon, U. S. N.

It may not be superfluous to remind officers attached to sea-going vessels that in time of war or during the prevalence of epidemics the work at a naval hospital is often so increased as to tax to the limit the energies of all on duty there. The cards of inquiry, under these circumstances, should be used with some reserve and only where a real scientific interest attaches to a case.

NEW MEDICAL JOURNALS.

The periodical medical publications of this country have been increased recently by the appearance of the first issues of the following:

Mental Hygiene, published by the National Committee for Mental Hygiene, Concord, N. H.

The American Journal of Syphilis, published by the C. V. Mosby Co., of St. Louis.

Medicine and Surgery, edited by Philip Skrainka, St. Louis.

All three give promise of occupying a high plane in current scientific literature.

We note especially the biographical sketch of Nikolai Ivanovich Pirogoff, by Dr. W. P. Coues, of Boston, in Medicine and Surgery, March, 1917.

It is a matter of regret that historical and biographical material of this nature does not occupy a more conspicuous place in our medical journals. The inspiration to work and the instructive yet pleasant quart d'heure derived from reading articles of this character are gifts well within the scope of American scientific publications which so far have fallen lamentably behind corresponding European publications in this regard.

As Dr. Coues remarks, Pirogoff is chiefly known in this country through the classic osteo-plastic resection of the foot bearing his name and yet Pirogoff was the first military surgeon to employ ether on the battle field, he advocated the use of warm ether, employed the plaster cast in the field, was the first to establish definite, organized first-aid stations behind the firing line. At the very time when Florence Nightingale was meeting obstinate opposition and severe criticism in her efforts to organize and improve the nursing of wounded soldiers in the Crimea, Pirogoff was utilizing sisters of charity and getting magnificent assistance from them in Sebastopol.

How far ahead of his time was Pirogoff, how admirable was his appreciation of the underlying factors of success in military surgery may be judged from his statement: "Not medicine but administration plays the leading part in the aid of the injured and the sick in the scenes of war."

EPIDEMIC JAUNDICE IN EUROPE.

The Archives de Medicine et Pharmacie Navale, an official publition of the French Navy, devotes all its reviewing space in the number for March, 1917, to reports on the epidemic, hemorrhagic, febrile jaundice conspicuously prevalent among troops on various fronts in the present war. We learn from quotations in this periodical that Baron Larrey, in the Egyptian campaign of 1800, reported cases of a febrile, hemorrhagic jaundice "resembling yellow fever," characterized by 15 days of fever, by prostration, insomnia, general malaise, epigastric and hypochondriac pain, by high mortality. This malady he "believed to be contagious."

Priority of description of the so-called Weil's disease, with which the present epidemic cases are believed to be identical, is claimed for Ozanam, 1846–1849, Monneret, Landouzy and other French investigators, and finally for Lancereaux, 1852, and Matthieu, 1886.

Inada and Ito, of Japan, isolated the causative organism, a spirocheta, in 1914.

Most of the authors quoted in the Archives speak of the difficulty of isolating the spirocheta from the human organism as an aid to clinical diagnosis in the field. It would appear that the spirocheta tends to disappear from the blood of patients during the progress of the disease and is not discoverable in the urine before the tenth day. If, as is usually the case, the patients report only after a period of delay, diagnosis must be made from symptoms alone. In some experiments the organism has been recovered from a guinea pig's blood after subcutaneous injection of a patient's blood; in others the animal has developed jaundice. Ito and Matsuzaki have obtained cultures with solid, semisolid and fluid culture media, preferably made from human or bovine blood serum diluted with distilled water. In liquid media the cultures are transparent. In from 3 to 10 days some cultures resemble those of the Treponema pallidum. Martin, Pettit and Vandremer report success in staining with the Löffler and van Ermengham cilia stains. Costa and Troisier find that during the initial period of the disease the spinal fluid is more virulent than the blood. They also report a positive complement fixation for syphilis in cases of epidemic jaundice. This had not previously been obtained. Martin and Pettit and some English investigators have found the spirocheta in rats collected in the trenches. Courmond and Durand, in an examination of 50 rats collected from the abattoirs and candle factories of Lyons, found 5 per cent of them infected with the spirocheta of hemorrhagic jaundice. While, therefore, for the present, the original theory of infection by the alimentary canal still holds, it is recognized that the abundance of rats in the trenches may have some relation to the spread of the disease there. Many cases of the specific jaundice described have been reported from Gallipoli, Flanders, and the Isonzo region.

Stokes and Ryle conclude an interesting and painstaking report of cases (Jour. Royal Army Med. Corps, September, 1916) by affirming their belief that the epidemic jaundice of Japan and Flanders are identical. In all their cases the onset was acute. Sometimes the symptoms were ushered in by prolonged syncope. Muscular weakness, prostration, vomiting were constant features of the initial stages. Fever was early and terminated by lysis. Jaundice developed after the third day. Diarrhea was rare. Pulmonary symptoms were limited to occasional blood-stained expectoration. Hiccough and stupor occurred in fatal cases. Sleeplessness in the early stages was the rule. Herpetic eruption about the lips and foul, dry tongue were frequent. The pulse rate was slow, even into convalescence. In certain cases albuminuria and acetonuria were present. Cases differ widely in severity. Lymphatic enlargements were present in all cases.

Martin and Pettit consider arsenical therapy a failure and believe that serum therapy offers the best line of attack. Their experiments in neutralizing the poison in guinea pigs both in vitro and in vivo by the use of horse serum have been successful.

CEREBRO-SPINAL MENINGITIS.

The periodical medical literature of Great Britain for the years 1914 to 1916 contains valuable data on cerebro-spinal meningitis. In the Lancet for January 13, 1917, H. D. Rolleston, Temporary Surgeon

General, Royal Navy, reviews the laboratory and clinical features of interest and analyzes the mortality tables of the British Navy for this disease. Elsewhere in this number A. Gardner Robb's article in the British Medical Journal, April 14, 1917, is reviewed.

When we consider how constantly the assemblage in barracks and camps of large numbers of young men of susceptible age is marked by an outbreak of cerebro-spinal meningitis, the subject becomes at once one of vast importance to a nation in process of calling its young men to arms from all parts of the country and beginning that intensive, hurried training which previous unpreparedness necessitates.

It is at such a critical moment in the Nation's history, and often only then, that past negligences and offenses come to light, and that the price has to be paid in large loss of life and paid before the eyes of all. Here a community has scorned the advice and oft-repeated recommendations of its health officer. There a town has resented sanitary measures, begrudging the expenses and inconveniences entailed by health measures. In still another locality political or social or moneyed influence has protected abuses that could only be abolished at the risk of votes, prestige, or business interests. Out of these towns, with their focuses of mumps, measles, smallpox, diphtheria, and meningitis, the young men go, by twos and fours, by the dozen or by the score, to commingle with other young men in the great concentration centers.

The regular habits, exercise, ample well calculated diet of military life will soon produce marked changes for the better in the physical condition of the recruit, but the first period of his service is inevitably marked by such radical changes in his daily habits, such emotional stress and perhaps by such physical fatigue and unavoidable exposure, as may well render him unduly susceptible to the contraction of zymotic disease. It is at this time, unfortunately, that he is exposed to the contagion brought by carriers from countless localities where there is no constant war on flies and mosquitoes, where animal parasites flourish, where the agitation for drainage and sewerage and sanitary plumbing and well ventilated apartments and ample air space is the bugbear of the authorities, or where, perhaps, quarantine, vaccination, preventive inoculations are frowned upon by ignorant, emotional people, who see in these measures nothing but persecution and the introduction of filth into a healthy body!

It probably never occurs to the writer of scare-head articles to consider that the health of soldiers in barracks and sailors in ships is invariably better than that of civilian communities during times of peace, and is only comparable to them when the Army or Navy is put into jeopardy by large influxes from centers of civilian population.

For example, during the year 1916 New York had 1, Boston 2, Detroit 3, Chicago 3, Kansas City 3, Omaha 7, and Dayton 10 cases of scarlet fever for every 1,000 inhabitants. During the month of April, 1917, the District of Columbia reported 3, Massachusetts 18, Wisconsin 21, Virginia 24, Maryland 29, New York 56 cases of cerebro-spinal meningitis.

In April, 1917, California reported 24 and Michigan 290 cases of smallpox for the month; Memphis (Tenn.) 15, Minneapolis (Minn.) 34, Sioux City 12 for the week ending May 5, 1917.

For the year 1916 the case rate for typhoid fever per 1,000 of inhabitants was 1 or over in Alabama, Indiana, Maryland, Pennsylvania, West Virginia, while the Navy rate per 1,000 was 0.33; in 1914, 0.19; in 1915, 0.26.

Face to face, then, with the enormous menace of the civilian population to our military service, when the former begins to flow in considerable bulk into the latter, we must prepare to meet the inevitable and contend against it as best we can.

The treatment is simple and generally understood. It depends, to be successful, upon early diagnosis and an ample immediately available supply of Flexner's antimeningitis serum. This, in doses of 15 to 30 c. c., is administered by lumbar puncture and repeated according to the effect. As regards early diagnosis, it is enough to say that every medical officer should have the thought of cerebrospinal meningitis ever present in his head. Every lad or young man who has severe headache or an attack of vomiting or falls out of ranks at drill or faints, whether from any apparent reason or not, should be suspected, removed, isolated, and examined, the examination to include, in suspicious cases, lumbar puncture and microscopic examination of spinal fluid, for which examination all preparations should have been made in advance, so that if the specific organism is recognized the serum can be administered while the patient is still on the table through the original puncture and needle in situ. In the presence of a recognized epidemic it is better to give an occasional serum injection to a patient who later proves not to have the disease than to hesitate for two or three days over a diagnosis and miss the chance to administer a remedy which is wonderfully effective in the first 24 or 48 hours and decreases in value with each day that passes thereafter.

On the other hand, what measures are necessary to prevent the spread of the disease in camp or barracks presents a problem still unsolved. While disinfection and quarantine should be employed with each developed case, general disinfection of buildings and premises has in the past appeared to have no influence whatever on the spread of the disease. We must rely rather on the application of general sanitary principles. Overcrowding in dormitories and mess halls, close order in military formations, unduly protracted drills, irregularity of meal hours, exposure to cold and wet must be scrupulously avoided. If the weather permits tent life is to be preferred to residence in barracks, and recruits must be encouraged to stay out of doors as much as possible. Lectures and entertainments which involve protracted assemblage in a crowded auditorium must be omitted. Every case of coryza and tonsillitis must receive prompt medical attention and all nasopharyngeal discharges should be collected on gauze handkerchiefs and burned. Recruits must be instructed as to the danger of spitting on floors, of coughing and sneezing near others and then held strictly to account for their behavior in this regard. Convalescents from the disease should be isolated until secretions are negative. Nurses in attendance upon them must as far as possible be kept out of contact with others and tested to see if they are carriers.

The question of how to go back further still and prevent the accession to the ranks of the original carriers themselves presents the greatest difficulty of all. It would seem scarcely practicable to examine the nasal secretions of every recruit, and certainly this could not be carried out at recruiting offices. If this were attempted at naval training stations it is doubtful if the results would be commensurate with the time and labor involved unless all newcomers were strictly isolated for a number of weeks, since any given recruit would inevitably be on the station and a part of the military body a certain length of time, and thus a possible menace even before he could be examined and reported upon. One is tempted to consider the possibility of excluding carriers by requiring a test prior to enlistment. In all large centers of population such a scheme is feasible. To-day the genuine and widespread patriotism of our citizens is showing itself in a thousand ways. Offers of service, of material, are pouring in from every conceivable source. We might call on the health departments of cities having a municipal laboratory for aid and require every candidate for enlistment to present a certificate from the board of health stating that he is not a carrier. This would do very well in large cities, but unfortunately small towns and rural communities, which are more affected than cities, possess no laboratories and no bacteriologists. Measures could, however be devised to obtain an examination for out-of-town applicants by the authorities of the cities where our recruiting stations are situated and radical as this may seem it might yield results more beneficial and more direct than anything done at a later stage in the recruit's history. It would seem from studies in Germany, Great Britain, and this country that in the absence of an epidemic about 2 per cent of the healthy population are carriers of cerebro-spinal meningitis. The loss by this exclusion at the outset would be insignificant and would more than counterbalance the loss through disability and death, and the expenditure of time and money resulting from the care of developed cases in the service.

In conclusion, we come back to the crying need in this great land of ours for municipal administration of a higher order. We have recently recognized and begun putting into practice the theory that not only does every citizen have rights at the hands of government but that government may and must demand everything from the citizen. Not only have the Army and Navy obligations to the civilians but civilians have duties to Army and Navy, and as they are more and more amalgamated into one ambient by universal training and service their interests become identical.

SUGGESTED DEVICES.

APPARATUS FOR REMOVAL OF SICK AND WOUNDED ON SHIPBOARD.

By J. S. TAYLOR, Surgeon, United States Navy.

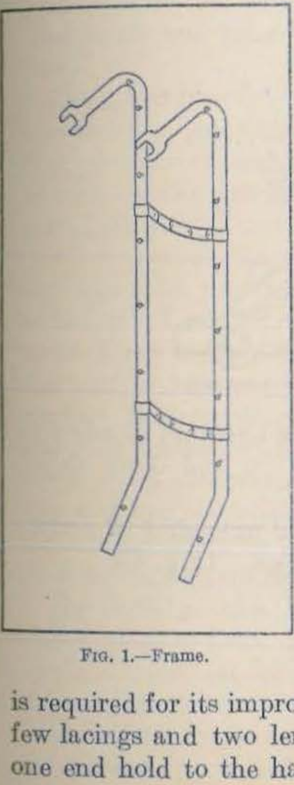


FIG. 1.—Frame.

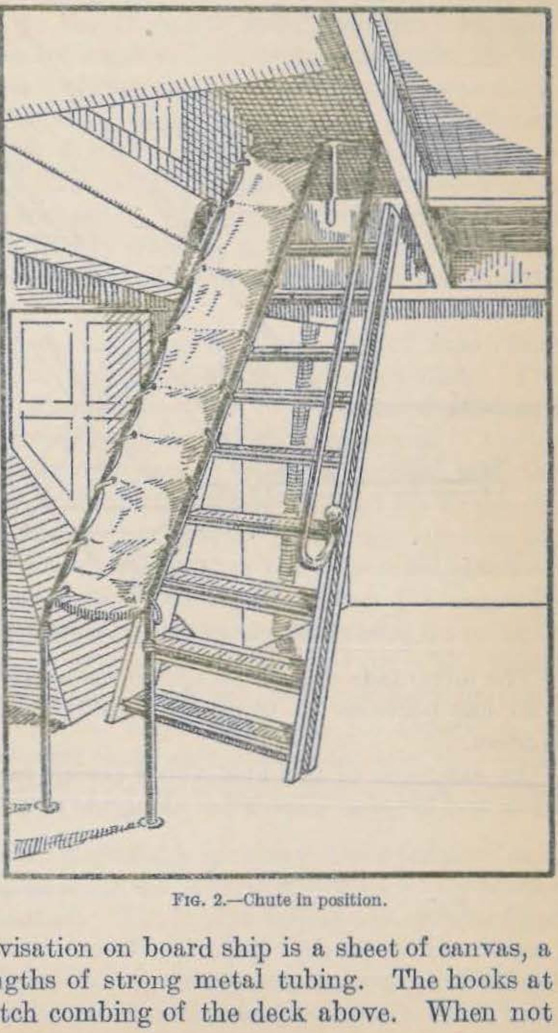


FIG. 2.—Chute in position.

A glance at the diagrams (Figs. 1 and 2) suffices to show the simplicity and value of the chute described in the German Naval Hygiene (Handbuch der Gesundheitspflege auf Kriegsschiffen, Jena, 1914) and used on board vessels of the German Navy during the present war, according to reports from our observers. All that is required for its improvisation on board ship is a sheet of canvas, a few lacings and two lengths of strong metal tubing. The hooks at one end hold to the hatch combing of the deck above. When not in use it can be stored in a very small space alongside of the Stokes stretcher. An improvement would be the addition of a jointed bar after the style of the supports to a buggy top placed transversely about the middle to maintain the chute rigid while in use and prevent sagging when the weight on it is unduly heavy.

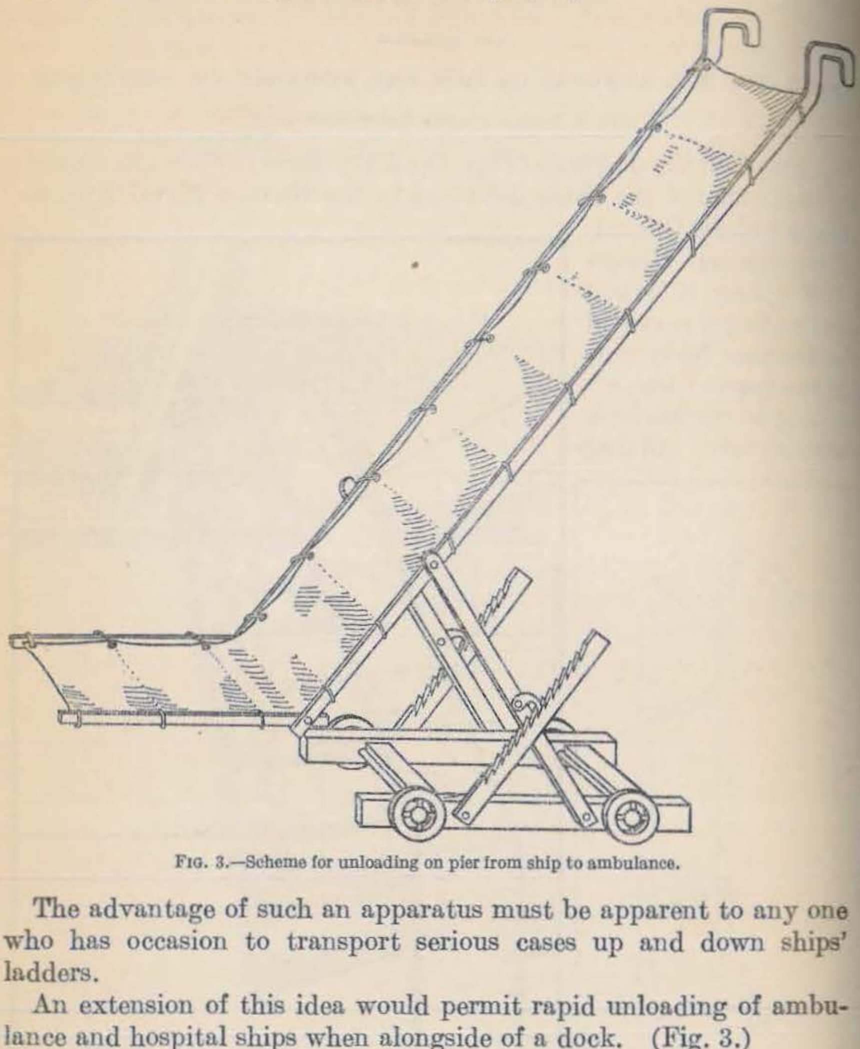


FIG. 3.—Scheme for unloading on pier from ship to ambulance.

The advantage of such an apparatus must be apparent to any one who has occasion to transport serious cases up and down ships' ladders.

An extension of this idea would permit rapid unloading of ambulance and hospital ships when alongside of a dock. (Fig. 3.)

CLINICAL NOTES.

NOTES ON X-RAY TREATMENT WITH SPECIAL REFERENCE TO SKIN LESIONS.

By A. Soiland, Assistant Surgeon, Medical Reserve Corps, United States Navy.

The purpose of this paper is to discuss briefly two recent factors which have considerably enlarged the scope of X-ray treatment, and to correct certain erroneous impressions relative to these. I refer to the Coolidge tube and to the "massive dose" technic. In some quarters these two terms are employed synonymously under the impression that a massive dose always means a Coolidge-tube treatment. Again, others believe that the Coolidge tube brews a very different kind of an X-ray, superior in curative qualities to that generated by the ordinary gas tubes. This has led to many disappointments, in that patients have been assured by their medical advisers that their particular disease would quickly clear up under a few Coolidge-tube treatments and later learned to their sorrow that such was not the case.

Along this line I recall one case wherein a patient had been under treatment in my office for a persistent tubercular syphilide. The skin over and around the diseased area had received its full tolerance of rays, yet the patient, while much improved, was not well. At this time both the physician and the patient were discouraged with the slow progress of the case and the physician requested me to use the Coolidge tube, under the belief that this would at once clear up the situation. I refused to do so, stating that the skin could stand no more X-ray treatment at present. However, neither the physician nor patient believed my advice to be sound and insisted on going to another Roentgenologist, who used the Coolidge tube. The result was that a severe radio dermatitis occurred, with resultant breaking down of all structures over the region exposed. An experience of this sort has occurred several times and is cited to show that judgment is necessary in using this powerful agent and to guard against its too promiscuous use.

The Coolidge tube to-day is available for every X-ray purpose, and, in the hands of those skilled in its use, it certainly offers a very precise mode of universal application. Yet in skin lesions the standard gas tube is just as efficient and may be handled with much less danger, both to the operator and patient. In deep work, however, the Coolidge tube stands unrivaled and it is here the massive dose is at its best.

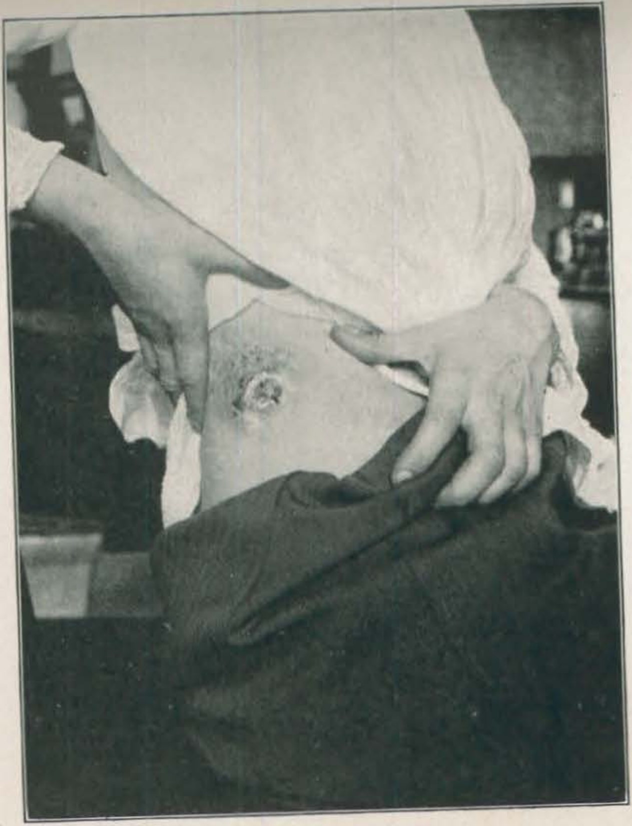
The massive dose is as yet a varying factor in therapy. Even among active Roentgenologists it is not yet fully standardized and varying intensities are found classified as "massive dosage" in individual laboratories; in fact, many of the older workers used massive dosage long before the Coolidge tube was available. Briefly, a massive dose may be defined as any single or continued exposure to the X ray which will yield under two millimeters of aluminum a definite but transient dermal erythena. A pastile or erythema dose is where one continuous exposure causes the same reaction without filter. While the Coolidge tube is better adapted for these exposures, massive effects may be obtained with any well-seasoned tube, irrespective of make or kind. The Coolidge tube, however, possesses one great advantage over any other type and that is, it permits of long-continued usage without an appreciable drop in potential or vacuum. This one fact alone places it in a class far ahead of any other tube, and the name, in honor of its creator has brought Roentgenology into fields hitherto inaccessible, and rendered possible real deep therapy. The rays from such a tube have a wave length and frequency closely approaching those of the gamma rays of radium and since they can be produced in such large quantities and much more cheaply than radium, will probably supercede the latter in massive work. Concerning radium it can be said that while this has a fixed place in therapeutics, its field is much more restricted and, from an analysis of clinical records covering all sorts of conditions, has so far failed to measure up in efficiency with standardized X-rays. Clinically the effects of the hard rays of both agents are identical. The softer radium rays, however, have a selective action and when these can be placed in direct contact with the lesion good results are frequently obtained.

The accompanying illustrations show a number of typical lesions, mostly malignant, successfully treated by X-rays. The photographs were all made in my office with an ordinary kodak, and are, therefore, not as sharp as could be desired.

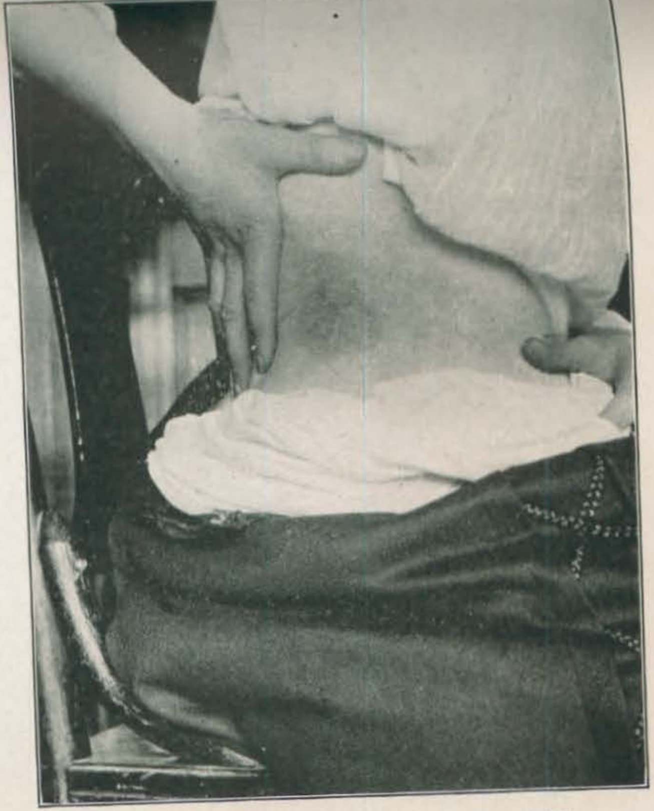
A REPORT OF FIVE OPERATIONS PERFORMED IN HAITI.

By R. B. Williams, Surgeon, United States Navy.

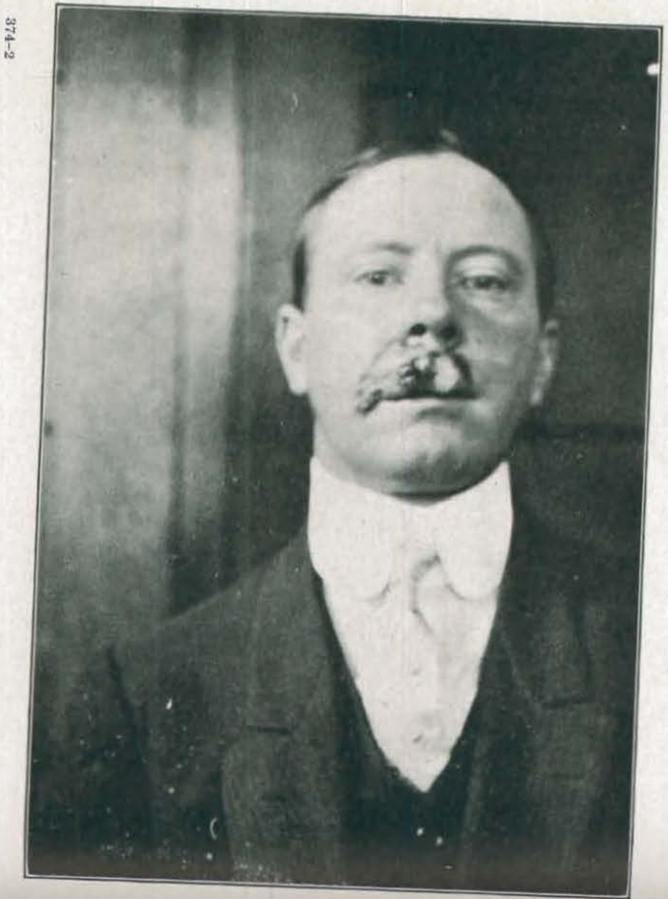
Soon after the intervention of the United States, in July, 1915, with the landing of the marines, a form of civil government was established in Port au Prince and other Haitian cities. Among the many duties of the "civil administrator" of Port au Prince, Capt. J. A. Rossell, Marine Corps, was the supervision of the city hospitals. The city hospital proper, the Hospice de St. Vincent de Paul, was found to be in a most deplorable condition. It had degenerated into a place for poor wretches to crawl into and die. There was practically



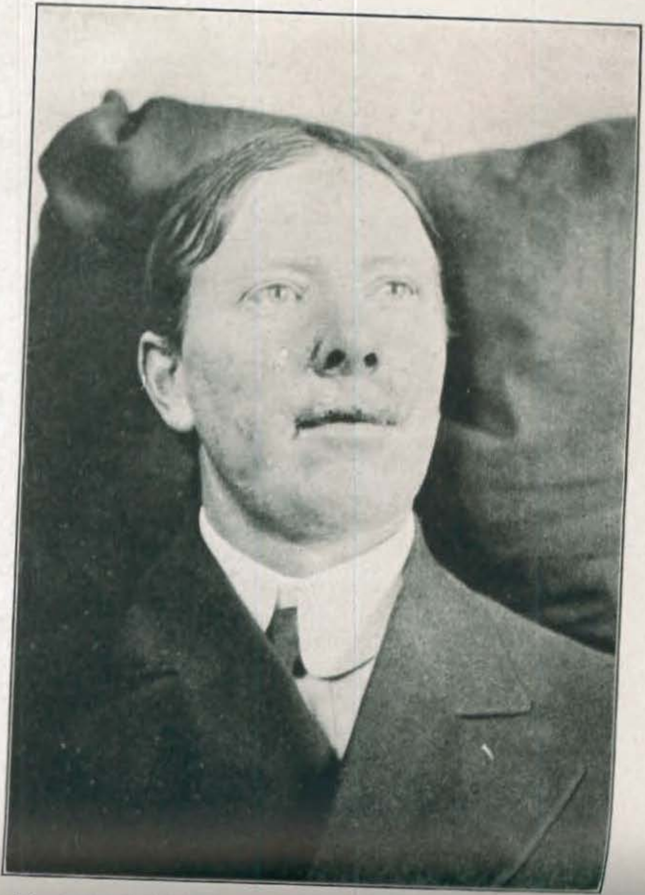
RODENT ULCER.



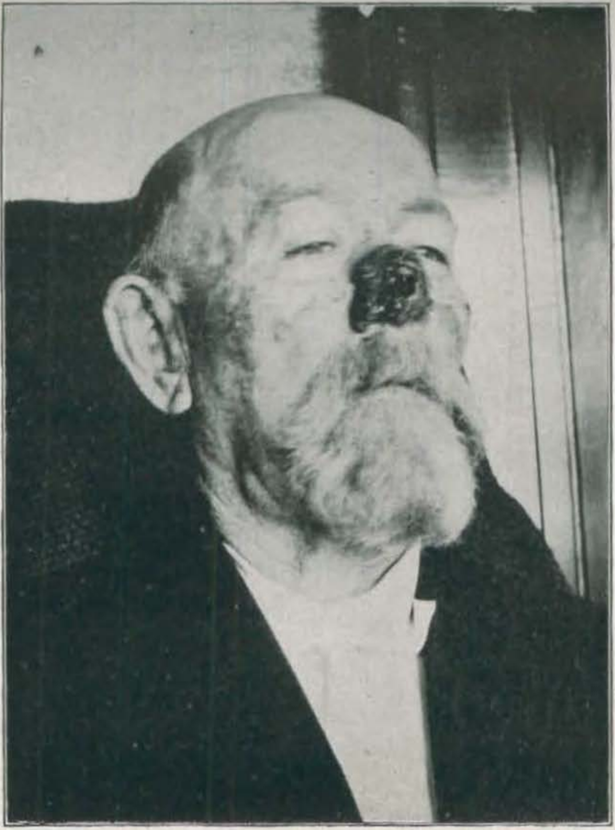
THREE WEEKS AFTER TREATMENT. NOTE X-RAY ERYTHEMA.



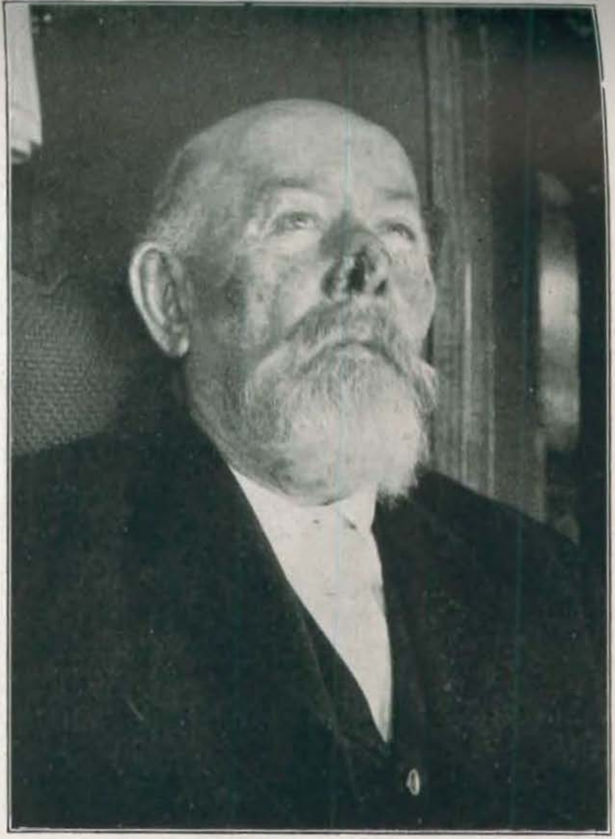
EXTENSIVE EPITHELIOMA OF UPPER LIP.



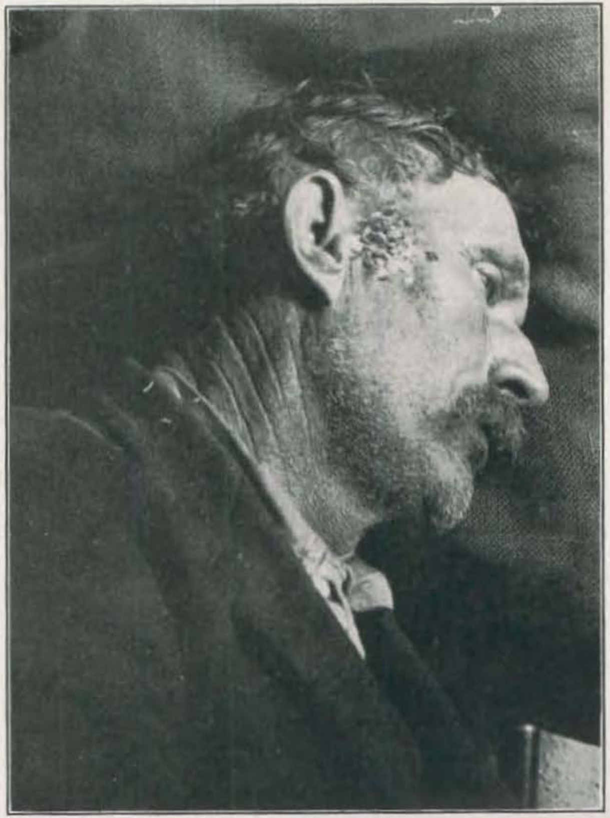
EXTENSIVE EPITHELIOMA OF UPPER LIP TWO MONTHS AFTER TREATMENT.



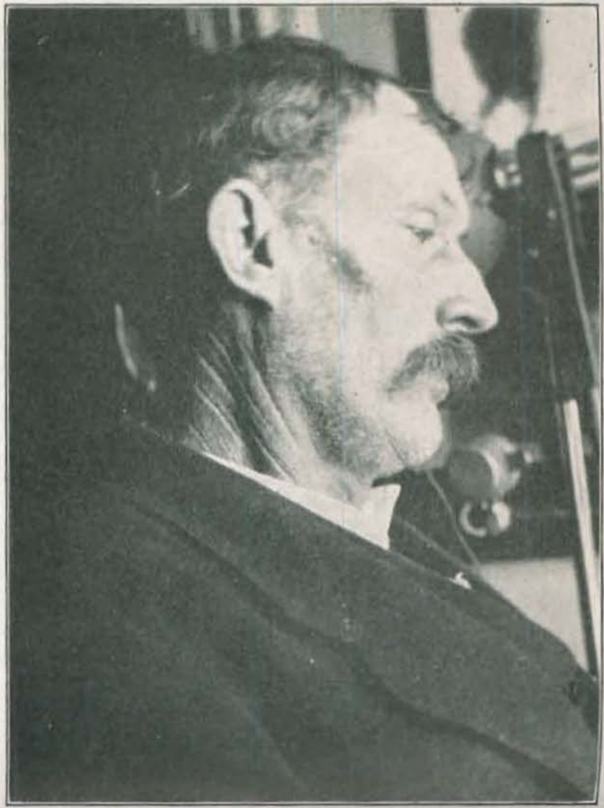
EPITHELIOMA BASE BEFORE TREATMENT.



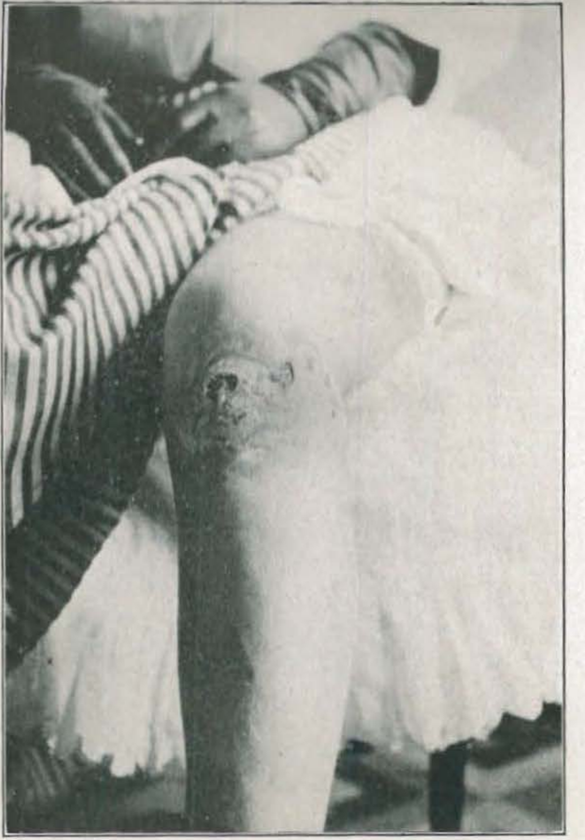
EPITHELIOMA BASE TWO MONTHS AFTER TREATMENT.



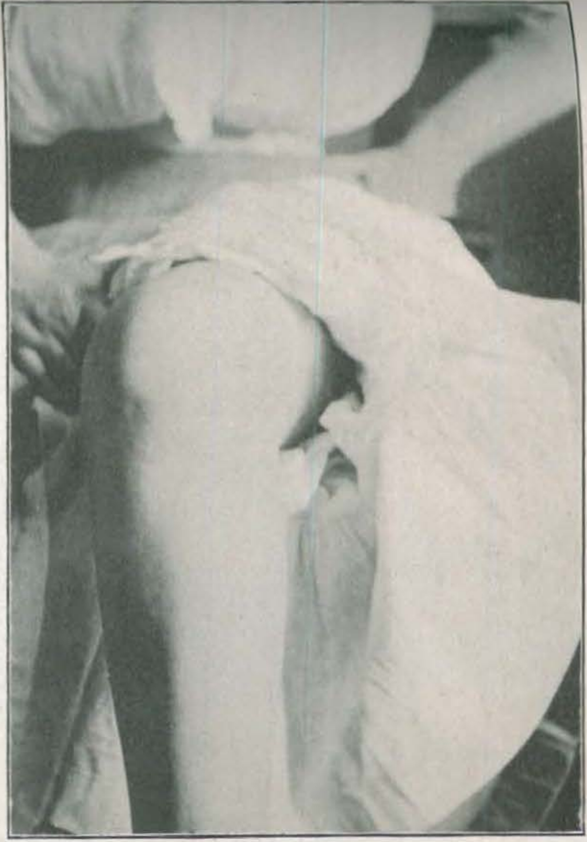
CUTANEOUS CARCINOMA.



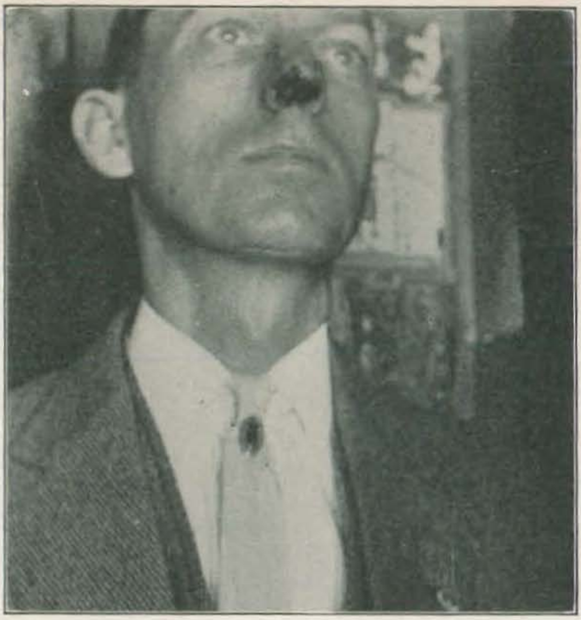
CUTANEOUS CARCINOMA ONE MONTH AFTER TREATMENT.



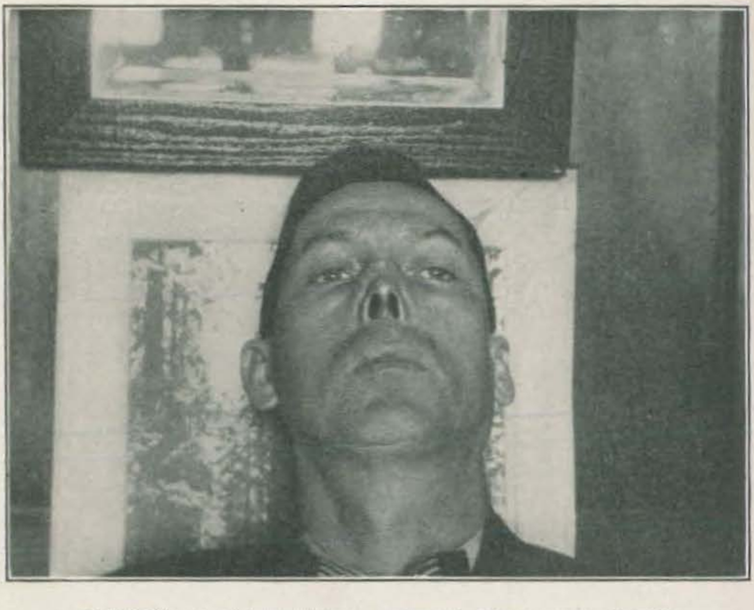
MIXED ULCER OF LEG BEFORE TREATMENT.



MIXED ULCER OF LEG SIX WEEKS AFTER TREATMENT.



TUBERCULAR ULCER OF NOSE.



TUBERCULAR ULCER THREE MONTHS AFTER TREATMENT.

no medical attention or nursing; and food, such as it was, was entirely inadequate. It was discovered that one native physician, drawing a monthly salary as an attendant to this institution, had not been inside the place for more than a year.

The Hôpital Militaire, adjoining the Hospice de St. Vincent de Paul, was in somewhat better condition. Here a number of sisters of the order Les Filles de la Sagesse conducted the institution and nursed the sick under the direction of native physicians. The equipment was of the poorest kind, the sisters were most inadequately housed and were given almost nothing with which to run the hospital.

Under Capt. Rossell's administration these two hospitals were merged into one and a fairly liberal monthly appropriation for maintenance and supplies was obtained from the commander of the expeditionary force.

This amounted to from $4,000 to $6,000. In addition, some $30,000 was spent in the erection of new buildings and in the renovation of the older ones. An appropriation of some $9,000 for medical and surgical supplies, operating room and laboratory equipment was obtained. Later, a motor ambulance was purchased.

The result of these efforts and expenditures was the conversion of the two old hospitals into a single institution so greatly improved as to be almost unrecognizable. In the new hospital, known as Hôpital General, there was a fairly equipped operating room, laboratory and X-ray outfit; new wards for surgical and maternity cases and for children were provided. In a new central building, containing kitchen and storerooms, the cooking for the entire institution was done. Accommodations were provided for 500 patients and this number was frequently exceeded. In May, 1916, upon Capt. Rossell's detachment, the entire control and management of the hospital was turned over to the writer.

With this brief description of the City General Hospital at Port au Prince we will report several cases of more than ordinary interest, selected from a large number operated upon at the hospital between the months of January and October, 1916.

Case No. I.—*Cyst of the popliteal space.*—Native girl, age 16, pupil at the Pensionnat de St. Joseph.

History: About one and one-half years ago there was first noticed a tumor in the left popliteal region, which has increased slowly and painlessly to the size of an orange. No history of trauma; general health not affected; growth interferes with function of leg to very slight extent. Patient active and healthy.

April 10, 1916.—Operation. Ether. Vertical incision 6 inches in length, middle of left popliteal space, the popliteal fascia divided to length of incision. External popliteal nerve drawn outward and the internal popliteal nerve drawn to inner side of the incision. Tumor exposed and freed by blunt dissection from the surrounding muscles and tendons. The growth was intimately adherent to the popliteal vein, from which it had to be separated by sharp dissection, and the knife had to be used to separate the tumor from the posterior surface of the femur at the upper angle of the popliteal space. The cyst was removed without rupture; it was oval in shape and the size of an orange; its walls were thin, smooth on the outer side, slightly rough on the inner side; the contents were slightly viscid in character. The wound was closed without drainage and primary union occurred. The patient was last seen in October and was in perfect health. The left popliteal space and function of the knee were entirely normal.

Comment: Cystic tumors of the popliteal space are of very rare occurrence. Cystic growths have been described occurring in the axilla, but so far as the writer is aware, no tumor of this character in the popliteal space has been described.

CASE No. II.—*Neurolysis.*—Leon Le Claire, age 22.

History: Leon Le Claire, age 22, while enrolled in the Government troops of Vilbrun Guillaume, who were engaged in putting down an insurrection led by one Dr. R. Bobo, was wounded on the 13th of May, 1915, by a rifle ball which passed through the left thigh, from before backward at the junction of the lower and middle thirds, fracturing the femur. At the end of about three months, the fracture having united and the wound having healed, the patient noticed that he could not lift his toes and that he had entirely lost sensation in the greater part of his leg. When seen in April, 1916, there was complete paralysis of all the muscles of the leg, the foot was flail like and there was complete loss of sensation in the area of distribution of the internal and external popliteal nerves.

May 2, 1916.—Operation. Ether. Vertical incision 12 inches in length, beginning at middle of the popliteal space and extending upward. The sciatic nerve was identified at the upper angle of the popliteal space, and on being traced upward, was found to be involved in a mass of extremely dense scar tissue which extended along the course of the nerve for a distance of 3 inches or more. This mass of scar tissue was divided down to the nerve and the nerve completely freed. No sign of injury of the nerve could be discovered. The course of the bullet would indicate that it had passed close to but to the inner side of the nerve, just above its division into the internal and external popliteals. The nerve having been completely freed from the mass of scar tissue—which evidently compressed it—was surrounded for a distance of about 6 inches with a flap of fat and fascia, removed from the thigh by undermining the extensive incision. The fat side of this flap, which was completely detached, was turned toward the nerve and its edges approximated around the nerve with a number of chromic gut sutures. The wound was closed without drainage and the leg put up on a posterior splint. The splint was retained for 15 days. At the end of one month, there was return of sensation, to a limited degree, to the entire anesthetic area and the patient could extend and flex his foot appreciably. At the end of the third month sensation had very greatly improved, the leg had materially increased in size and flexion and extension, though feeble, had considerable range. At this time the patient was walking with a crutch. At the end of the sixth month, the patient, with the aid of a cane, was walking all around the place and was able to flex and extend his foot to almost its normal limit. Sensation was almost completely restored.

Comment: The improvement in this case was striking and was much more rapid than ordinarily described in such cases. The function of the nerve was evidently completely destroyed by the pressure of the scar tissue and was quickly restored on the relief of this pressure.

Case No. III.—*Nerve suture.*—Etienne, native boy, age 18.

History: On the 8th of July, 1915, while serving in the same expedition as the patient above mentioned, was shot through the upper part of the left thigh. The bullet entered the middle of the front of the thigh and emerged posteriorly at the lower border of the buttock. The patient was transferred to the Hôpital Militaire at Port au Prince, where the wound healed quickly; but, on attempting to walk, it was discovered that the left leg was almost completely paralyzed.

On examination it was found that the power of flexing the leg upon the thigh was almost entirely lost. There was complete paralysis of all the muscles of the leg, and a total loss of sensation in the area supplied by branches of the great sciatic nerve. There was marked atrophy of the muscles and the foot was in an accentuated varus position, the weight being borne upon the external malleolus.

May 4, 1916.—Operation. Ether. (Ten months after the injury.) Vertical incision, about 10 inches in length, down the middle of the back of the thigh, beginning above the fold of the buttock. By drawing the biceps muscles inward the nerve was exposed for about six inches. Just above the level of the lower border of the gluteus maximus muscle a nodular enlargement of the nerve was found, which caused a slight oval swelling and was of distinctly firmer consistency than the normal nerve. The nodule was directly in the track of the bullet and in this case there was practically no scar tissue, the wound having apparently healed by first intention. About one and one-half inches of the nerve was resected, including the nodule, the nerve being cut across with a sharp knife, about three-quarters of an inch above and below the center of the nodule.

It was then found impossible to approximate the ends of the nerve, so a flap of one-third the thickness of the nerve was turned up from the distal portion and carefully sutured to the proximal end with No. 0 chromicized catgut. A transplant of fat and fascia, some 5 inches in length and 4 inches in width, was removed from the thigh adjacent to the wound and carefully sutured around the anastomosis, with the fat side turned toward the nerve. The wound was closed without drainage and the leg was retained in a flexed position.

Comment: The result in this case was remarkable; the bedside notes show that on the 17th of July, one month and 13 days after the operation, the patient was able to flex his thigh, the varus position of the foot had disappeared and the leg had materially increased in size. On attempting to walk the toes dragged somewhat but there was distinct dorsal flexion. At the end of the sixth month the patient was walking around the ward without the use of a cane. Cutaneous sensation was feeble but distinct and there was still some dragging of the foot. The patient disappeared from the hospital at about this time without having been discharged. He evidently considered himself cured.

CASE NO. IV.—*Enormous inguinal hernia.*—Messam, Jamaican, age 60. Operation. Cure.

History: A hernia of 20 years standing which had resisted attempts at reduction, by native physicians, for 10 years or more.

Examination showed a well-preserved man of 60 years or more with an enormous scrotal hernia of the right side reaching almost to the knee. After several attempts, complete reduction was effected and operation determined upon.

May 15, 1916.—Operation. Ether. Eight-inch incision parallel to Poupart's ligament, extending onto scrotum. With considerable difficulty, an enormous sac was freed from the scrotum and its neck clearly defined. The deep epigastric artery was on the outer side of the neck, showing that the hernia was of the direct type. The neck of the sac was carefully ligated with a purse-string suture of No. 4 chromic catgut and the stump, after being whipped over with the same suture, was allowed to retract into the abdomen. The orifice, through which the abdominal contents had protruded, was circular in shape, almost 2 inches in diameter and surrounded by a dense fibrinous ring. This large defect was closed—as suggested by Nassau—by displacing the rectus muscle outward beneath the conjoined tendon and suturing this muscle to Poupart's ligament with interrupted chromic catgut sutures. The transversalis and the internal oblique muscles were next sutured to Poupart's ligament, in the usual way, and the external oblique aponeurosis imbricated. The patient stood the operation well and left the table in good condition.

Recovery was complicated by a moderate skin infection and by the collection of fluid in the enormous cavity in the scrotum, left after the removal of the sac of the hernia. This postoperative hydrocele was tapped two or three times and a small amount of Tr. iodine injected on each occasion, which procedure cured the condition.

Comment: The great thickness and toughness of the sacs of large and very long-standing herniae of this type and the adherence of the sacs to the surrounding structures is noteworthy, frequently requiring sharp dissections. The question arises as to the best method of dealing with large scrotal cavities resulting from the separation of these sacs. From prolonged pressure and occasional attacks of inflammation of the scrotum, the tunica vaginalis is so firmly adherent as to make a radical Jaboulay operation difficult or impossible. In a number of cases of postoperative hydrocele, resulting from the removal of these large scrotal sacs, cures have followed tapping and the injection of iodine, in every case.

CASE No. V. *Successful removal of an extremely large abdominal tumor.*—Julia Vilus, native of Leogane, age 17. Admitted June 14, 1916.

History: Enlargement of the abdomen was first noticed a little more than a year ago, and has steadily increased. The growth has been practically painless, with the exception of occasional shooting pains in the back and legs. Menses ceased about the time the growth was first noticed.

Examination showed that the abdomen contained considerable fluid and a very large solid tumor extending from the symphysis pubis to the ensiform cartilage. The percussion note was flat over the entire abdomen. Prior to operation the abdomen was tapped five times and about two quarts of serous fluid was removed at each tapping. About one month before operation edema of the legs appeared. The urine was negative. Vaginal examination seemed to indicate that the tumor arose from the uterus.

September 25, 1916.—Operation. Ether. Median incision from ensiform to pubes. Upon opening the peritoneum 2 or 3 quarts of serous fluid escaped. The tumor, which was dark red in color and traversed by enormous veins, seemed to fill the entire abdominal cavity, no abdominal viscera being in sight. Fluctuation being present in the upper portion of the tumor, an incision was made in this part and a very large amount of gelatinous fluid with whitish chalk-like particles escaped from the tumor, reducing its size by about one-third. Upon lifting up the tumor thus reduced, the small intestines stomach, and liver could be seen compressed against the diaphragm. Anteriorly and below, the uterus was found flattened out against the tumor but not forming a part of it. Above and posteriorly, the colon was seen, running across the tumor and closely attached to it. Enucleation was begun from above by separating the colon from the tumor by blunt dissection, with ligation of all heavy masses of adhesions. The uterus was then separated from the tumor below, thus leaving the tumor attached by two broad pedicles, which were evidently the broad ligaments. These were ligated in sections with heavy chromicized catgut beginning on the right side, where there seemed to be more room. In this manner the tumor was completely freed from all attachments and removed. The resulting large denuded area was covered with peritoneum, as far as possible, and the abdomen closed without drainage.

Convalescence was very stormy for the first six days, the temperature and pulse becoming normal on the tenth day, following which recovery was uneventful. Four months after the operation the patient was in robust health and had gained greatly in weight.

Comment: The tumor weighed 21 pounds. In the abdomen, before the evacuation of its fluid contents, its weight was probably 30 pounds. In cutting into the tumor mass, it was found to contain much mucoid material and a hard substance, apparently cartilage. There was no bone or hair. The tumor apparently arose from the right ovary, but neither ovary was seen during the course of the operation.

A CASE OF UNCINARIASIS WITH SEVERE ANEMIA.

By J. J. A. McMullin, Passed Assistant Surgeon, United States Navy.

This case is reported because of the following chief points of interest:

1. The severe degree of anemia associated with hookworm infection, the blood picture resembling pernicious anemia.
2. The care necessary in the performance of agglutination and hemolysis tests prior to blood transfusion and the difficulty experienced in this case in finding compatible donor.
3. The temporary improvement following blood transfusion with compatible blood.
4. The development of pneumonia and the necessity of properly protecting debilitated patients from exposure.

The patient, M. P., a Filipino, age 22, employed in the navy yard, applied for treatment on October 6, 1916, complaining of headache, dizziness, weakness and constipation, which symptoms he first noticed about six weeks ago. The symptoms, although very troublesome, did not prevent the patient from working up to this date.

Upon admission he appeared to be extremely anemic, temperature 101.4 F, pulse 130, resp. 28, marked pulsation of jugulars, loud bruit over cervical vessels, loud systolic murmur over precordium, loudest at base, systolic thrill on palpation, heart not enlarged, lungs negative, spleen and liver not enlarged, W. B. C., 6,200; R. B. C., 1,200,000; Hb., 35 per cent; coagulation time, 12 minutes; color index, 1.5; sp. gr., 1,052; differential count: Poly., 55; Sm. lymph., 10; Lg. mono., 3; Tr. 2; Eosin., 5. Blood pale and watery, microcytes, macrocytes, normoblasts, megaloblasts, poikilocytes, and stippling were present; no parasites. Feces contained ova of Necator Americanus and Ascaris lumbricoides. Urine negative.

October 7. Thymol grs. xl given in divided doses, preceded and followed by Mag. Sulph.

October 9. Feces contained a few adult hookworms and microscopically a moderately large number of ova. Temperature, a. m., 99.2 F., p. m., 99.4 F., Fowler's solution m. iv t. i. d. to be increased m. 1 daily.

October 12. Condition has remained unchanged since last entry. Direct vein to vein transfusion attempted, but only partially successful. Tube was too large to fit into vein of patient and after being introduced, not without considerable difficulty, the patient suddenly moved and the tube slipped out and could not again be introduced. Several tubes were tried. One-half hour after the transfusion patient had a severe rigor, followed by a rise of temperature to 105.4 F., and considerable respiratory embarrassment.

October 13. Temperature, a. m., 99.2 F., p. m., 99.6 F.; respiration, 26; pulse, 120; W. B. C., 2,400; R. B. C., 650,000; Hb., 10; sp. gr., 1,040; coagulation time, 2 minutes; Differential: Poly., 56; Sm. lymph. 22; Lg. lymph, 8; Lg. mono., 7; Tr., 5; Eosin., 2.

October 15. Condition unchanged.

October 20. Since last entry temperature has fluctuated between 100 F. in a. m. and 101.2 F. in p. m. Blood of eleven donors examined; patient's serum agglutinated and hemolized the cells of ten donors; one compatible. The ten incompatible donors were natives, close relatives and friends of the patient; the compatible donor was a Caucasian. Thymol treatment repeated. Patient transfused with 500 mils of blood by the Lewisohn method.

October 21. R. B. C. 1,140,000, Hb. 40. No reaction followed transfusion.

November 4. W. B. C. 2,300, R. B. C. 900,000, Hb. 25 Differential: Poly. 27, Lymph. 59, Mono. 7, Tr., 6, Eosin., 2, megaloblasts 3, normoblasts 1. Feces contained hookworm eggs. Since October 21 temperature has been ranging between 99 F. a. m. and 99.4 F. p. m., pulse 102, respiration 20, no change in murmur over precordium and large vessels. Thymol treatment repeated, grs. xlv given: Fowler's solution discontinued.

November 5. Patient had chill followed by rise of temperature to 103.6 F., pulse 120, respiration 32, crepitant râles and friction rub heard over base of left lung; later in p. m. both bases dull on percussion, numerous râles.

November 6. Temperature 103.6 F., respiration 50, pulse 140. Physical signs of consolidation of both lower lobes, W. B. C. 7,000.

November 7. Patient died this a. m. Autopsy showed fatty degeneration of the heart muscle, fatty degeneration of the kidneys and liver, atrophy of the spleen, punctate hemorrhage in mucosa of stomach and intestines, lower lobes of both lungs in stage of red hepatization.

The patient's red cells on the day following the sodium citrate transfusion were increased to 1,100,000 and his hemoglobin to 40 per cent. This improvement in the blood picture, however, was only temporary, as evidenced by the examination on November 4.

It seems opportune to make some remarks concerning blood transfusion and the tests for blood compatibility. Blood transfusion since it has been facilitated by syringe methods, the use of anticoagulants and defibrination appears to be popular everywhere. There is some danger, therefore, that transfusion will be too frequently and injudiciously employed. The danger of agglutination and hemolysis of either the donor's or patient's cells is more frequent than is generally supposed. Lindeman[1] says that, "In some instances as many as 20 or 30 donors were examined from whom only one would prove satisfactory according to standard." Moss has shown that when iso-agglutinins are present in blood serum iso-hemolysins may or may not be present, but that if iso-hemolysins are present iso-agglutinins are invariably present. The conclusion is that it is only necessary in determining blood compatibility to test for iso-agglutinins. We have found this to be true in forty specimens of blood examined experimentally at Olongapo. The microscopic examination for agglutination can be done quickly, and is attended by very little technical difficulty. Agglutination is often prompt, but the reading should not be made in less than thirty minutes. The blood of the first donor in the case herein reported was incompatible with the patient's blood, but this fact was not ascertained until after the patient had his sharp reaction following the transfusion. The cause of this error was due entirely to the fact that only ten minutes elapsed before the agglutination reading was made.

Brem[2] has called attention to the fact, originally mentioned by Moss, that iso-hemolysins in either patient's or donor's serum may act so rapidly that the accompanying hemolysis will mask the agglutination reaction. The serum producing hemolysis should be mixed with a serum known to be compatible with the red cells used in the test. Such a compatible serum will contain anti-hemolysins but not anti-agglutinins, and will thus prevent masking of agglutination.

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[1] Blood Transfusion, Lindeman. Jour. Am. Med. Assn., Vol. LXVI. 1916. P. 623.

[2] Blood Transfusion, with Special Reference to Group Tests. Brem, Jour. Am. Med. Assn. Vol. LXVII, No. 3. Pp. 190-193. July 15-16.

Considering the simplicity of the microscopic agglutination test and the rapidity with which the tests can be performed and the result obtained, it seems unnecessary, even hazardous, to omit these tests in most of our severe and urgent cases.

All human blood is classified by Landsteiner and Hektoen[1] into four groups by microscopic agglutination tests of the serum against the corpuscles. It seems to me that this method of grouping blood, ingenious as it is, is not feasible in the service and would only be highly useful if it were done on a grand scale, i. e., to have every officer and enlisted man's blood group determined and entered on his health record.

A factor which may have hastened the inevitably fatal end of this case was an electric fan, which a well-meaning hospital apprentice directed full blast on the left side of the patient, the side on which the pneumonia started. The patient was exposed to the fan about two hours. The word draft is somewhat despised at present, but some emphasis should be placed upon the necessity of vigilantly protecting debilitated patients from direct exposure to electric fans or other violent currents of air.

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[1] Infection, Immunity, and Specific Therapy. Kolmer, 1915. P. 274.

PROGRESS IN MEDICAL SCIENCES.

REVIEWERS.

Medical Director E. R. STITT, United States Navy.
Surgeon E. THOMPSON, United States Navy.
Surgeon H. F. STRINE, United States Navy.
Surgeon J. A. RANDALL, United States Navy.
Passed Assistant Surgeon R. C. RANSDELL, United States Navy.
Passed Assistant Surgeon G. B. TRIBLE, United States Navy.
Passed Assistant Surgeon E. W. BROWN, United States Navy.
Passed Assistant Surgeon D. G. SUTTON, United States Navy.
Passed Assistant Surgeon G. F. CLARK, United States Navy.
Passed Assistant Surgeon R. H. LANING, United States Navy.

GENERAL MEDICINE.

LEISHMAN, W. B., and SMALLMAN, A. B. **Tetanus and antitoxin treatment.** Jour. Roy. Army Med. Corps, March, 1917.

A scholarly, scientific and conservative report of cases covering treatment in France and England, with tabular statements in which dosage, prophylaxis, route of administration and incubation period are discussed. Owing to the limited figures available, the unfavorable conditions under which reports were made and the recognized ease with which figures may be misinterpreted, the authors refrain from definite conclusions, but from their conscientious and judicial balancing of facts the reviewer is justified in quoting them as follows:

Incidence.—This appears to be greater in wet weather, as "it is obvious that the change from dust to mud will mean a heavier bacterial inoculation of the wound."

Complication of gas gangrene very frequent in fatal cases.

Wounds of body infected by tetanus give distinctly higher mortality than do wounds of the extremities.

Period of incubation varies from 2 to 90 days, 21 being the normal limit.

Fatality.—The shorter the period of incubation, the greater the mortality.

Prophylaxis.—"The earlier the preventive dose is given after the receipt of the wound the more likely is it to be of benefit."

Quantity of serum.—Never use less than 500 units as prophylactic. In treating a developed case everything seems to point to the value of large doses. Prefacing their statement as to dosage by the admission that cases recover where the dose has been ridiculously small and die in spite of enormous doses, the authors suggest that the daily administration should not be less than 10,000 units for a developed case where the subcutaneous and intramuscular routes are employed.

Mode of administration.—The following is given as the order of merit of the different routes for introducing the antitoxin: 1 intramuscular, 2 subcutaneous, 3 intraspinal, 4 intravenous. A combination of the first two methods is advisable in many cases. Granting that "we have in antitoxin a perfect antidote it is an affair of trying to bring antidote and poison in contact with one another within the shortest time and under the most favorable conditions for neutralization to take place." The alternative lines of attack are three and no more; the local factory of toxins, the line of transit to the central nervous system and the nervous system itself. The first would be ideal if we could locate it with precision. The central nervous system is difficult to reach and at best is an attempt to recapture from the enemy a position they have already taken and hold in great strength. The intrathecal injection aims at such a local assault but depends for its possible success on two assumptions, namely; that the antitoxin actually comes into contact with the poisoned nerve cells and that having done so it is able to neutralize or withdraw from these cells the tetanus toxin which has reached them. In practice, the results of this line of attack appear to the authors from their own cases and others observed most disappointing.

"There appear to be grounds for considering that the subcutaneous and the intramuscular channels offer greater prospects of success than the intravenous method for the reason that the dose of antitoxin thrown into the veins is immediately diluted by the whole volume of blood and subsequently of the lymph and by the time any portion of it comes round to the site where it is required it must be very dilute indeed." The authors regard the comparatively slow rate of absorption by the subcutaneous and intramuscular routes as a distinct advantage in that there would be a battery of the tissues along the supposed path taken by the poison from wound to cord, especially if injections were made near the wound. "Further * * * it is probable that the antidote would remain available locally in considerable strength for a number of hours. On the other hand assuming that antitoxin is absorbed from the muscles with comparative rapidity this would be a reason for utilizing that channel in order to reach the nerve centers rapidly through the general circulation in cases where it is hoped to effect an early dissociation of toxin from these centers."

In cases where the intrathecal injection is preferred the serum should contain no preservative. It is undesirable to withdraw more than 10 to 15 mils of cerebro-spinal fluid or to replace this by a greater volume of antitoxin. It might be desirable to use for this purpose a solution of desiccated antitoxin which would be free from preservatives and could be rapidly prepared under sterile conditions in the desired concentration.

Nonspecific treatment—carbolic acid and magnesium sulphate—is now abandoned, but adjuvants in the shape of sedatives—chloral, bromides, morphine, opnopon, chloroform, alcohol and paraldehyde—still have a part to play.

(ED.)

ROBB, A. GARDNER. Serum treatment and the importance of early diagnosis in epidemic cerebro-spinal meningitis. Br. Med. Jour., Apr. 14, 1917.

Published records show marked improvement in the mortality rates of 1916 compared with those of 1915 and 1914. The mortality was 50 to 60 per cent in the severe epidemic in the British Isles during the winter of 1914–1915. In the large epidemics in New York and elsewhere in America in 1904–1906 the death rate ran to 75 per cent and over, and the same rate prevailed in Scotland and Ireland in 1906–1907. In the spring of 1907 Flexner introduced the spinal injection of serum. Its adoption led to the immediate reduction of the death rate to one-third of what it had been. Since then the death rate has varied from 25 to 30 per cent, and in some epidemics even better results were obtained.

The writer had 300 cases in the first seven months of 1907 with a mortality of 72 per cent prior to the use of Flexner's serum. While the epidemic was still going on the new method was adopted and the mortality dropped immediately below 30 per cent. In a total of 270 cases treated by the writer with Flexner's serum the mortality just exceeded 26 per cent.

Apart from the severity of the attack, the most important points are early diagnosis and the age of the patient.

British Navy, August, 1915, to July, 1916—95 cases.

		Death rate.
74 cases treated on first to third day	per cent..	24.7
15 cases treated on fourth to seventh day	do....	33.3
6 cases treated after seventh day	do....	50.0

Soldiers in the London area—43 cases.

		Death rate.
33 cases treated on first to third day	per cent..	9.09
10 cases treated later than third day	do....	50.0

Belfast—48 cases.

		Death rate.
36 cases treated in first five days	per cent..	22.2
12 cases treated after fifth day	do....	41.6

The great importance of early treatment can not be fully shown by statistics, because in every considerable epidemic there are cases of very fulminant type dying in a day or two or even within a few hours. The writer cites the following typical case: A young man of 28 years, of splendid physique, and a noted athlete, first complained at 8 a. m.; by 10 a. m. he was wildly delirious. He was then removed to hospital; before noon he was comatose, and he died at 1 p. m. Total duration of case was five hours.

Analysis of 48 deaths, considered with reference to age, shows:

		Death rate.
1 to 2 years	per cent..	33.3
2 to 30 years	per cent or less..	25.0
31 to 40 years	per cent..	50.0
Over 50 years	do....	100

The most hopeful line of treatment is by lumbar puncture, drainage and the intrathecal injection of carefully prepared polyvalent antimeningitis serum given vary early and in sufficient dosage.

In 48 cases quoted above the average number of punctures was 4 and the average amount of serum 90 c. cm. The largest amount used in a single case was 280 c. cm.

[ED.]

Treatment of gas asphyxiation. Lancet, London, Mar. 31, 1917.

Dr. Chassevant is reported as using oxygen inhalations with remarkably gratifying results. Oxygen is administered through a rubber tube or catheter carried far back into the buccal cavity. The catheter is connected with the cylinder of compressed oxygen. By opening and shutting the key active rhythmic insufflations, 15 to 16 per minute, are brought about. This treatment is supplemented by subcutaneous injections of camphorated oil. Dr. Chassevant emphasizes the necessity for insufflation under pressure to aerate the blood and relieve the patient of the pain incident to inspiration.

(ED.)

BISHOP, L. F. **Metabolism, arteriosclerosis, and diet.** Jour. Med. Soc. New Jersey, February, 1917.

The term arteriosclerosis covers the degenerative disorders of the cardiovascular-renal system. Involved in this consideration is the matter of the durability of the human machine—how long it is going to last under the strain of active living. This leads us necessarily to the study of metabolism and nutrition.

It is very hard to understand, but the great fact remains that, however dissimilar the protein molecules upon which an animal is fed, the end results of digestion metabolism is the production of flesh which is characteristic of that animal.

When the broad statement is made that the degenerative diseases of the cardiovascular-renal system are primarily founded upon a disturbance of metabolism we refer particularly to the disturbances of metabolism that pertain to proteins after they have been digested in the intestinal tract and while they are being digested by the individual cells. We must form a conception of a secondary digestion by which it is necessary for the flesh made up of the individual cells to take the material that has come from the intestinal tract and subject it to an infinitely more intricate process before it can be appropriated and made useful for the nutrition of the body and for the production of energy and efficiency and activity in these cells.

Arteriosclerosis is primarily a cellular disease involving the cells of the whole body, and only secondarily involving the organs—the heart, blood vessels and kidneys. At the present time a good many people agree that the degenerative diseases of which arteriosclerosis is the type commence as disturbances of this intricate relationship between proteins, after intestinal digestion, and the cells of the body. Following a disturbance of metabolism occur the organic changes which progress to the hypertrophied heart, the thickened blood vessels, contracted kidneys and so on.

A belief promulgated by the author is the influence of diet on the production and cure of arteriosclerosis. Metabolism fails, not with regard to the whole class of proteins, but with regard to particular proteins.

In advanced cardiovascular-renal disease, when the kidney was badly damaged and the disease well established, both professional and lay opinion interdicted animal foods in proportion to the severity of the case. So people with very badly damaged kidneys were often put on a purely vegetarian diet. In all these diets milk is an exception. Milk is the only food in all nature that was specially designed for the nourishment of the human body. Every other food was picked up at random and adopted as a matter of convenience or as it was found to be useful, but it was not made specially for the human body. Milk, human milk—and, by analogy, the milk of animals—was so constructed. There are very few instances—and they are very striking on account of their fewness—in which milk is harmful. This is true in spite of the fact that it is a highly nitrogenous food. Milk is an exception and we leave it out when we consider questions of diet.

The origin of arteriosclerosis in a great many instances lies in acquired food idiosyncrasies—that is, up to a certain time the man did very well as to his digestion and metabolism, but at some time in his life he had a great nervous strain, or a severe illness like typhoid fever, a severe surgical operation, a profound food poisoning, or some accidental physical knock-out. Then the trouble begins.

Another great source of acquired food idiosyncrasies is in periods of strain and worry.

This food idiosyncrasy is undoubtedly in the nature of anaphylaxis; that is, the cells of the body have been put into a condition by some accident whereby particular proteins are irritating to them.

If these acquired food idiosyncrasies which lead up to degenerative diseases are in the nature of an anaphylaxis, then, if diet is to be of any use, it must be an absolute diet.

People who have the arteriosclerotic condition are idiosyncratic to food and unless you exclude the whole quantity of harmful proteins you get no particularly good results. Moderation in the use of diet in these people is of no use. If they are idiosyncratic to meat you must cut it all out. If they are idiosyncratic to eggs, all eggs must be excluded; in the same way with fish. If you give them a little you keep up the irritation of the cells and the disease progresses.

In practical work, when people come to you with high blood pressure, with involvement of the kidneys, hypertrophy of the heart, and everything which goes with advanced arteriosclerosis, then you must deprive them of all the animal proteins at once. All eggs, fish, meat and stock soups are to be excluded. Put them on vegetables, cheese, fruit, milk and bread and butter—all they want.

Later, experiment with those foods which are known to be the least harmful. I find that when people are tired of a strict diet they can often commence on white meat of chicken. Fat of bacon is also tolerated. Give them chicken, all they want of it, because the diet of arteriosclerosis is qualitative and not quantitative.

This diet is called the "few protein" diet. It is founded on the theory explained. The reason for dieting people is that they are idiosyncratic to particular foods. This diet is also less annoying. Tell the man he can have all he wants of the limited foods and he can not accuse you of starving him to death.

(J. A. R.)

MENTAL AND NERVOUS DISEASES.

SOLOMON, H. C., and SOUTHARD, E. E. **Gold sol. diagnostic work in neurosyphilis.** Jour. Nerv. and Ment. Dis., March, 1917.

The authors present some very interesting facts relative to findings with Lange's gold sol. test applied to post-mortem spinal fluid. Variations in the returns from different locations of the cerebro-spinal system in the same subject were noted and an attempt was made to explain these variations by histological examination of the underlying tissues. In some of the cases the cerebral fluid yielded a "paretic" reaction and the spinal fluid a "syphilitic" reaction. These same cases showed on histological examination a parenchyma change in the cerebrum and not in the cord. As a result of examination of spinal fluid containing occult blood the authors suggest that there is a possibility of the blood modifying the gold sol. reaction. In fluids giving a negative Wassermann and containing occult blood the Lange test has shown a "paretic" reaction. The authors express the opinion that "The gold sol. reaction is probably based on the appearance in the fluid of substances produced in the process of atrophy and sclerosis." Attention is called to the fact that the fluids of patients under treatment may vary from time to time in reaction, in some cases the cells being reduced to normal, the albumin content decreased and the Lange test becoming atypical while the Wassermann remains positive. In fact, any combination of findings may be noted, but a gold sol. reaction is never negative when the Wassermann with the fluid and the globulin reaction are positive.

(D. G. S.)

WHITE, W. A. **Underlying concepts in mental hygiene.** Mental Hygiene, January, 1917.

The author in his usual clear and direct manner makes a very strong plea for a broader understanding of mental concepts in general. It is pointed out that the term "insanity" is after all a legal and sociological concept rather than a medical one. It has been used to express a group of indefinite symptoms which have indicated nothing to the medical mind except that the individual referred to was thought to be incapable of getting along in his immediate environment and needed institutional care. In other words the individual labeled "insane" has failed at the social level, has shown certain deficiencies in his reactions to his environment which those about him agree to be incompatible with the social standards of the locality. The individual who is found to be socially inefficient will very probably be mentally deficient in some respect. The author uses pauper and criminal as illustrations of the socially inefficient who, for the sake of argument, we will say, have the same levels of mental deficiency. The only difference between the two being the character of their respective reactions to their environment. "One has committed a definite offense against the community while the other has not."

Every individual is constantly endeavoring to adjust himself to his surroundings and in this process integration plays a very essential rôle. The end result to a large extent depends upon the person's ability to assimilate elements in his environment or to shape the environment to agree with his own particular needs or demands. At the psychological level conduct is the governing factor and it is on this basis that the individual is judged.

(D. G. S.)

ADLER, H. M. **Unemployment and personality.** Mental Hygiene, January, 1917.

One of the greatest problems which confront the Naval medical officers on recruiting duty is that of discovering the actual and potential psychopaths among the applicants for entrance into the service. This is true under normal peace conditions so it is needless to say that present conditions have accentuated this point in proportion to the increased number of applicants. As a large number of the applicants appearing each day give a history which suggests a mild or well developed "hobo" type the work of the recruiting surgeon would be very much simplified if he were familiar with the general mental characteristics of that class of people. Stress of time makes it practically impossible for the examining surgeon to go fully into the family and personal history of each applicant, but if he possessed a clear insight into the general mental make up of those who report that they have held numerous positions in a short period of time, or of those who have had no employment, our incidence of mental sick days would be materialy decreased. The author very clearly discusses this phase of the mental hygiene work and every officer in the service should familiarize himself with the contents of the article referred to. He states that to properly handle the subject in question it is necessary to understand the nature of the individual and with this in view he has grouped the patients under three general headings, according to their character or personality. Under the first heading, paranoid personality, he classes all those who react to their environment in a self-centered manner, those who are convinced of their own great importance or ability, are altruistic or seem satisfied with being continually in the lime light. Under the same classification we have those evidencing the depressed phase. Here we have the individual who is surly, suspicious, depressed, unappreciative, etc. Under the second heading, inadequate personality, we have the mental defectives and feebleminded. In the third group, the emotionally unstable group, we have those who are mentally capable of handling the ordinary problems of life, but who for some reason show at times considerable psychomotor activity, and mild hypomaniacal symptoms. By the same token we may have indications of depression with accompanying lack of initiation, slowness of thought, irascibility, etc. The author points out the necessity of ascertaining the patient's reason or explanation for unemployment.

(D. G. S.)

SURGERY.

SPEED, K. **Observations of a senior surgeon commanding the surgical division of a base hospital in France.** Surg. Gyn. and Obstet., April, 1917.

The author states that for soldiers who exercise freely, marching 15 miles a day carrying an extra weight of 56 pounds, who live an outdoor life, have no alcoholic drinks and who are fed on an abundance of good, plain food, training and general health have considerable bearing on their general ability to resist shock and infected wounds.

Fighting conditions are very unfavorable. Trench warfare is waged in ditches 9 feet deep. The soldiers operate in mud and dirt. There is lack of exercise and frequently bowel stasis. The difficulty of transportation of wounded through communicating trenches, the compulsory exposure to the elements while lying out waiting to be picked up and the complications caused by secondary wounds received from enemy fire while lying in transportation or even in dressing stations are also important factors. Men were received who had lain as long as six days in the open with no attention, no food or drink, and frequently with large areas of painful sunburn from exposure.

Casualty clearing stations, the collecting points of several field ambulances, are being discontinued as the great benefit of immediate transportation to the near base hospital is appreciated. Opium, especially morphine, is used freely for wounded men at the front. The use of iodine as a part of first-aid dressing has fallen off and cyanide gauze is being largely substituted for it.

At base hospitals it seems wise to separate the wounded into different wards, according to the types of injury—head ward, chest ward, buttock ward, fracture of the femur ward, etc.

Punctured and lacerated wounds form the majority of all admissions. They exist with or without bone involvement and foreign body. Routine treatment consists in early excision of ragged edges and removal of the foreign body, the wadding, if cloth, being as important as the metal. One must not make the mistake of opening limbs filled with blood unless the infection has become alarming and then preparation for large vessel ligature must be at hand. The X-ray is of great value in making an early diagnosis of gas infection. Practically all wounds trimmed and searched for foreign bodies demand drainage. Large fenestrated or split tubes are the best means of effecting this and are combined with instillations of eusol (Dakin's solution). Hypertonic salt solution 5 to 10 per cent has also been used for wet dressing or irrigation on suppurating surfaces.

The use of the steel helmet is an important factor in lessening the severity of head wounds. The majority of late deaths is due to meningitis. Ventricular infection is always fatal. Permanent mental disturbances, excluding shell shock, are very rare. Epilepsy is less common than usually supposed. The author believes that every head case should be given bromides early to avoid formation of the epileptic habit. Cerebral hernia is fairly common, is difficult to treat and gives a mortality of 20 to 40 per cent. In removing foreign bodies every effort should be made to prevent damage to the brain tissue and to prevent hernia cerebri. Emphasis must be laid on spinal puncture for its therapeutic and diagnostic value.

In spinal injuries the symptoms are more definite and less liable to improve than in head injuries. If the evidence shows severance of the cord or a septic tract to the cord, the dura should not be opened. Foreign body or bone pressure on the cord is amenable to operation. Operative opening of the dura invites infection, death generally occurring when the bulb becomes involved.

Bladder injuries give poor prognosis. Injuries of the external genitals heal nicely, but demand long care and plastic work later. Buttock injuries are obviously difficult to care for. The author found that support on the Bradford frame with air dressings gave the best results.

Nerve injuries are relatively uncommon. Paralyzing contusions which at first suggest complete severance of main trunks will often show full recovery in three to four weeks. One should be slow in making diagnosis and never operate in the presence of infection.

Blood-vessel injuries are interesting and often overlooked, unless there is immediate alarming hemorrhage or a quickly forming aneurism. Vein injuries lead to great distention of a limb which in a few days simulates either extensive pyogenic or gas infection. As a rule they are best treated expectantly. Secondary hemorrhages are numerous, many of which end fatally. Neck injuries, chest injuries, abdominal injuries, injuries of the extremities, tetanus, gas gangrene and gas poisoning are briefly discussed.

The author states that like any civil surgeon he entered war surgery with the most conservative ideas regarding amputations. He now believes more early amputations should be performed, the method being dictated by the severity of infection expected or already present. "Guillotine" amputations, circular with no flaps, give excellent drainage and often suffice without further limb shortening by the use of the stump splints and secondary bone amputation where the granulations are clean. Amputation with spinal anesthesia is very satisfactory and often possible when a general anesthetic is undesirable.—(H. F. S.)

LOCKWOOD, A. L.; KENNEDY, C. M.; MCFIE, R. B.; CHARLES, S. F. A. **Observations on 500 cases of gunshot wound of abdomen.** Brit. Med. Jour., March 10, 1917.

The 500 cases were admitted while fighting was actually going on and were treated at the most advanced casualty clearing station in the area. Cases were never received earlier than 9 to 12 hours after being wounded and often not till 14, 36, or 40 hours after. They came in rushes. One night there were 36 in three hours besides 60 other operation cases. Of the 36, 4 were moribund. The 500 in question were strictly intra-abdominal out of 710 abdominal wounds.

All cases prepared for operation or needing resuscitation on admission got subcutaneous or intravenous salines, warmth, elevation, camphor in oil, omnopon. The effect of resuscitative measures on apparently hopeless cases was marvelous, but attendants must not be deceived into waiting too long, since improvement is usually but temporary.

Pain.—Varies from dull ache to sharp stab. Severe in wounds of diaphragm and referred to epigastrium. Acute in large wounds of stomach with extravasation. Worse in wounds of large intestine than in those of small intestine. When referred to lower abdomen it may be due to retention of urine and so relieved by catheterization.

Site of wound.—Foreign body may attain abdomen from wounds in any part of the body—buttocks, back, axillae, hips, etc.

Pulse.—Great factor in determining when to operate. Rate of 120 or over in abdominal cases precludes operation (unless due to hemorrhage) until after preparatory stimulation.

Rigidity.—A sign of huge value. May be localized or widespread; localized, for example, when there is a lateral wound involving colon, a formed fecal fistula or an abscess. The *flaccid* abdomen, too, is significant. It is usually associated with extensive lacerations of large or small intestines with little hemorrhage, and comes prior to peritonitis. Bad prognosis.

Respiratory rate.—Depth is important. A freely moving abdomen has no marked intraperitoneal injury.

Facial aspect is important. Drawn and anxious appearance suggests internal injury and hemorrhage.

Vomiting.—Usually present.

Urine.—Note if blood-stained.

Preparation for operation.—Where patient's condition permitted he was washed and put in clean pajamas, the abdomen having been shaved and cleaned with picric acid, 1 per cent in spirit and omnopon and scopolamine having been administered one hour prior to anæsthetizing with hot ether and oxygen.

The rule was to *excise* the wound and explore the tract of the missile. A paramedial incision usually preferred. Wound cleaned with Dakin's solution. Edges smeared with 1 per cent formaline in vaseline. Rubber dam and sterile towels used as covering. If hemorrhage was profuse, examined spleen, liver, and large vessels. If there was a hint of injury to some special organ, began with this, then examined stomach, small intestines, large intestines.

Intestine should be delivered and examined 10 or 12 inches at a time. Delivery of whole bowel permissible only when extreme haste is indicated. Rough manipulation seems worse than exposure in producing shock.

Make careful search for posterior wounds of large bowel. Hasty examination may break down peritoneum and permit infection of abdomen.

Mesenteric vessels are commonest source of intra-abdominal bleeding.

Resection for laceration or perforation is never so good as a purse string unless injury is so extensive as to threaten the blood supply; unless traumatism is so great as to threaten vitality of the part or unless too much constriction of the lumen of the gut will result.

No. 0 catgut was used to stop bleeding from freshened edges if they required it. Then a linen purse string and a few Lemberts, as required, were used alike for stomach and bowels.

If wounds of the rectum lead back through posterior wall or floor of the pelvis we brought up the posterior parietal peritoneum in front of the suture line, so as to occlude the traumatized area from the abdominal cavity.

Kidney.—It is usually wiser to leave the kidney, even when lacerated, in place for removal later on, but hot saline compresses should be applied and replaced later with rubber dam.

Liver.—Expectant treatment of the liver is indicated unless there is concomitant injury to another viscus and severe hemorrhage. Hemorrhage is controlled by deep catgut sutures and rubber tissue packing. The toilet requires care. The liver's resistance to infection is small. Never leave a foreign body in the liver but remove it at once.

Mesentery and omentum should be repaired with catgut if torn.

Diaphragm.—Wounds of this muscle are very fatal unless repaired at once, when they usually do very well On opening the abdomen if a tear was found and promptly repaired the improvement in pulse, breathing and color was enormous. Intestinal paralysis was not infrequent after operation on small intestine done 10 to 12 hours following injury. This could be obviated by milking the intestine just before closing the abdomen from above the distended down to the sutured area.

With large extravasations of stomach and bowel contents into the abdominal cavity the temptation is to irrigate. The ultimate results are always bad, though for the moment the patient seems benefited. Be content to wipe and mop. Drape rubber dam freely about the saturated area and use a central split tube.

The abdomen is closed in three layers unless the tissues are edematous or suggestive of gas when only the peritoneum is sutured. Silkworm gut sutures through skin, rectus and sheath are inserted but left untied for use later. Apply a binder. Raise head of bed.

Following operation use Fowler's position when patient is out of the ether. Use heat externally, omnopon, aspiration of pelvic tube. Camphor in oil for heart failure. Pituitrin is valuable for promoting peristalsis, but dangerous to patients suffering from shock. Give them 1 oz. brandy in 7 oz. hot saline per rectum q. 3 h. for two or three days. If there is a stomach lesion nourishment consists of raisin tea or barley water, 1 teaspoonful for two or three days. If lesion was lower repeated sips were allowed.

Vomiting and hiccough relieved by small sips of brandy or champagne or 8 minims tr. iodine, in water, 1 drachm.

Chewing gum is useful to relieve thirst and clean up a dirty, dry typhoid tongue.

Early operations gave best results. After 30 hours they were less promising. Often they served merely to drain fecal abscesses.

Wounds of large abdominal vessels universally fatal before they come to the operator. Wounds of solid viscera not so dangerous as those of hollow viscera. Cases with herniated loops of bowel exposed do badly. Avoid resection. End to end anastomosis preferred to lateral. Careful repair of diaphragm wounds gives excellent results.

(ED)

FRASER, J., and DRUMMOND, H. **Three hundred perforating wounds of the abdomen.** Brit. Med. Jour., March 10, 1917.

Following experiments on Belgian hares, we have come to believe that lateral are better than end to end anastomoses. In doing the latter fringe of mucous membrane obtruding at open ends must always be clipped away.

Devascularization of the colon due to tear of mesentery is better endured than devascularization of small intestine. Experimental wounds of small intestine showed very little extravasation of contents and always less than wounds of colon.

Wounds of stomach.—Entrance and exit often astonishingly close together; often same size. At or near pylorus exit wound is greater than entrance. Nausea is relatively commoner than in other wounds. Blood in vomitus frequent. Less collapse than where bowel is wounded. Respiratory rate increased more than pulse rate. The severest symptoms come from wounds of upper and lower curvatures and cardiac end. Always examine posterior wall. Wounds there are often overlooked.

Small intestine.—Where a bullet passes through the pelvis it is not uncommon to find pelvic intestines riddled with holes within a very limited area. Massive escape of the gut is rare Peristalsis appears to be suspended for a while following injuries. "The less the degree of damage to the gut and the fewer the perforations, the more likelihood is there of extensive peritoneal soiling." The converse is believed to be true also. Instead of resecting mesentery, try to do simple suturing and ligation of divided vessels. Even if gut remains viable subsequent distention and paralysis is likely. Treatment preliminary to operation is essential. Almost invariably use median incision. Identify cæcum. Trace intestine up from lower ileum. As each perforation is exposed wrap it in a moist swab to one side of which a tape is stitched. Slip the tape through the mesentery and double twice around the swab-covered gut. In this way each perforation is indicated. Examine entire gut before selecting method of repair. Choice lies between: 1. Simple suture. 2. Resection and lateral or end to end anastomosis. 3. Resection and temporary enterostomy. Very few wounds of small intestine not amenable to suture. The contraindications are extensive damage to mesentery, such wounds as when sutured will greatly narrow the lumen (c. f. long oblique wounds) and associated necrosis of surrounding bowel. Resection is more thorough and complete, but it always produces vastly more shock than suturing. Lateral anastomosis better than end to end closure.

Wounds of duodenum have a very high mortality. A majority of cases die before reaching the operating table owing to the proximity of the viscus to vena cava, vena portæ, aorta. Right kidney is frequently wounded at the same time. Bile often escapes into the peritoneal cavity. Shock and nausea are marked. The treatment is suture. The work is facilitated by mobilizing the duodenum by incising the parietal peritoneum on the outer side of the right kidney.

Wounds of the colon, especially the vertical portions, show a tendency to become shut off and localized. Effusion into retroperitoneal and retro-colic tissue is frequently fatal due to rapid absorption and establishment of virulent septicemia.

Colon wounds are very liable to secondary hemorrhage.

Treatment: Within 24 hours open abdomen through separate incision; after that enlarge original wound. Use simple suture. Suture with proximal colotomy or colotomy at site of injury. Use drains in loin to retro-colic space if injury is in ascending or descending colon.

In wounds of the rectum the projectile usually entered through the buttock. Commonest site is lower anterior wall. A common accompaniment is fracture of pelvis, perforation of bladder, perforation of small intestine. If uncomplicated the shock is not severe, and in the early stages the symptoms are ill defined and may be overlooked. Retention of urine or dysuria and hemorrhage from rectum may occur. Use a primary catgut line of sutures followed by Lemberts with linen thread. Colostomy may have to be considered.

Wounds of the bladder are constantly obscured by traumata to other viscera. Open the abdomen, suture the bladder wall, drain the pelvis. If the rupture is extraperitoneal a suprapubic incision is indicated and inspection of anterior wall. If inaccessible for suture, rely on drainage by perineal and suprapubic incisions.

Wounds of kidney.—Here bleeding may not show in the urine when pelvis of kidney and upper ureter is blocked by large clots. Anyhow, bleeding is not excessive and may stop *sua ponte* unless a large vessel has been cut. If the wound is retroperitoneal the local signs are rigidity of abdominal wall, tenderness of half the abdomen on palpation, flatness in one or both flanks. The treatment is drainage and suturing of the kidney or nephrectomy. The former is the treatment of election in the bulk of the cases. The indications for nephrectomy are hemorrhage from larger renal vessels and great destruction and laceration of tissue. *Exploration* should be through the abdomen; *removal* through a lumbar incision.

Wounds of spleen are diagnosed by the location, by muscular rigidity on the left and signs of fluid in abdomen. If case is uncomplicated, the symptoms are relatively mild. With severe hemorrhage, of course, the prostration, etc., is marked. A small penetrating wound with little bleeding is best left alone. If, on the other hand, there is much destruction of tissue or bleeding, remove spleen at once.

In wounds of pancreas all the signs of injury to a viscus of the upper abdomen are present, nausea being conspicuous. Arrest of hemorrhage and drainage are called for. Damage to the liver almost constantly involves lung or pleura. Jaundice is not common and clinical features may be scanty. Evidences of pulmonary involvement obscure the hepatic symptoms. Pulse temperature and respiration are increased, the upper abdomen is rigid, percussion may reveal effusion in right iliac fossa. Post-traumatic jaundice usually suggests sepsis. The treatment is to investigate, plug and drain.

In the vast majority of cases of penetrating abdominal wounds operation offers the best chance of recovery except, perhaps, in some cases of uncomplicated liver and kidney and spleen injury. Spontaneous recovery from injuries to the hollow viscera is very rare. When these cases reach the hospital the rule is to find intense collapse. It is wise to wait one or two hours before operating to allow some degree of recovery from the shock, increased by the journey from the field, unless, of course, there is serious bleeding. Morphin has often been exhibited to excess. Half a grain should be the maximum quantity given in all. As stimulants are apt to start up hemorrhage effort against shock is limited to use of external heat and 1 c. c. m. pitiutary extract by hypodermic. The operating theater should be warm and likewise the operating table. The patient should be in the Trendelenburg position. Just before and throughout operation give salines subcutaneously. Speed is imperative. Where the case demands special haste close abdomen by one through and through suture of silkworm gut, using a needle on a handle. Rectal and subcutaneous salines after operation.

Acute dilatation of the stomach occurs as a complication. There is nausea, distention and vomiting of bile containing fluid. The symptoms may suggest peritonitis but lavage at the outset relieves promptly.

(ED.)

Don, A. **Abdominal injuries in a casualty clearing Station.** Brit. Med. Jour., March 10, 1917.

Ether and a saline usually buck up the patient a little at the start and as hemorrhage is by far the commonest cause of death in the first 24 hours, operation is indicated in a large proportion of abdominal cases. Peritonitis is a later danger arising from rupture of a hollow viscus or infection of effused blood and, except in wounds of stomach and upper intestine where contents are acid and irritating, peritonitis does not at first produce painful or alarming symptoms or so great shock as simple hemorrhage. Escape of contents of small intestine in lower portion, or from colon is rare in cases seen early at a casualty clearing station—say in first 24 hours. It seems as if the blow caused by the rapid transit of the missile so paralyzes the bowel that no movement takes place for at least 24 hours and on opening the abdomen the infection is found in the track of the wound only. The morphia administered in the field ambulance perhaps helps to produce the paralysis.

The indications for laparotomy are: Pain, rigidity of recti, signs of shock or hemorrhage. When these symptoms are masked the diagnosis of serious intra-abdominal lesion is certain in nine cases out of ten.

Pain varies in degree. Hemorrhage pure and simple into the peritoneal cavity causes more pain and rigidity than any other condition. Wounds of liver, colon and spleen give the most rapid hemorrhage, but the abdomen may be found full of blood from rupture of a single vessel in omentum or mesentery.

The abdominal wall, at first tense and retracted, becomes later full and plump, suggesting to the eye an ascites. Dullness in the flanks and fluid in the pelvis may be made out if searched for.

In most cases it is best to enter through the wound, which is made the center of an oblique incision in the line of the nerve supply when the wound is outside the recti. The incision is vertical when the wound is in the area of the recti. An elliptical cut excises the wound and gives a clean edge. The ends may be prolonged to give an opening 7 to 9 inches long. If necessary recti may be divided and fixed to their sheaths with safety pins to prevent retraction and facilitate suturing later. The injured organ is usually found immediately under the entrance wound. Examine small intestine from above downward or from below upward, according to which side of patient you are standing on. The operator examines the side next to him as he pulls bowel out; the assistant examines and returns the bowel. Not more than 2 feet should be drawn out at one time.

When a rent in the bowel is found, do a simple closure or excision. Two clamps are put on the points meeting at mesentery. Cut away between, leaving an inch of bowel and half an inch of mesentery projecting from the clamp for suturing. An end-to-end anastomosis is done immediately by operator while the assistant continues the search for other injuries and remedies them.

Wide excisions are not required, as the bowel is usually normal right to the edge of the rent. The essentials are efficient workmanship, speed and a minimum time of exposure.

The traverse of the missile must not be the only area examined for injuries. The concussive force of a missile is sometimes sufficient to rupture liver, spleen and kidneys, though it may not damage the hollow viscera. Splinters of bone may make multiple injuries. After thorough search is over, pour in normal salt (hot as can be borne by the surgeon's bare arm) from a jug. This is done chiefly for its stimulating effect on heart and respiration.

Pituitrin, hypodermoclysis, saline and turpentine enemata belong to the after treatment. Feeding by mouth with milk, tea, beef tea, etc., may be begun after recovery from the anesthetic, provided alimentary canal was not perforated high up. An egg flip with juice of one-half a lemon and a dessert-spoonful of sugar is given when thirst is excessive. These patients may go to the base after a week, if necessary, but are best retained at clearing station until all danger is past.

Liver.—Chief danger is hemorrhage, usually from under surface, and hard to control by suture. Rupture and disintegration may occur, though the actual contact of the missile was very limited. Use catgut sutures, and push eye of needle through first. Undetached omentum may be stitched into a large gap to control bleeding and increase the security of the grip of the sutures.

Spleen.—Wounds not so numerous. Suturing is difficult. Hemorrhage is very severe at first. If in condition to function at all, best not to remove, as blood-making function is so important. Omentum may be used to cover the organ.

Stomach.—Wounds very frequent. Pain is very severe. Posterior rent is obscure and difficult to repair.

Colon.—In some cases simple suture suffices.

Rectal wounds.—Colostomy.

Bladder.—Catheterization may suffice until patient reaches a base hospital. Suprapubic drainage may be necessary.

Small bowel.—Injuries are very frequent, but are not very fatal if uncomplicated and treated early. (ED.)

BLOOMHARDT, S. L.; ANDREWS, C. F.; and HETHERINGTON, R. R. **Symposium on experimental surgical studies.** Surg. Gyn. and Obstet., April, 1917.

The great omentum has been the subject of medical interest and research for more than 3,600 years, yet, in this era of scientific enlightenment, it is still an organ of much mystery. It has been worshipped and relied upon by the surgeons of the past and of the present, and it is the purpose of the paper to present data which will ead surgeons to rely more upon it in the future.

Dr. John G. Clark, in his lectures, calls the omentum the policeman and the philanthropist of the abdomen. Dr. John B. Deaver says, to his mind, it is more like a fireman who hears the first alarm and hastens to the scene with the necessary means to smother the flames. It wraps itself around inflamed areas, protects against slow perforations, walls off purulent collections and aids in absorption and exudation.

From experiments conducted on dogs, the authors conclude their report as follows: "It seems to us that we have proved the omentum quite capable of caring for gastric and intestinal perforations of varying sizes; that it can be used to advantage in anastomotic work, and is capable of preventing gangrene of large areas of gut wall." Having seen the results of the experimental work, the last question that confronts us is, naturally, What are a few of the practical applications in abdominal surgery?

1. Since adhesions can not be prevented, and since they do occur in a large majority of instances, make use of them.

2. Omental adhesions are less dangerous, therefore are preferable to adhesions between adjacent loops of gut.

3. Utilize the free border of the omentum at the time of operation rather than allow it and adjacent viscera to form promiscuous adhesions.

With this in view we advance a few surgical conditions in which it may be used:

1. In perforations caused by various means, gunshot wounds, perforated ulcers, as gastric, duodenal, typhoid, etc., where the patient is in shocked condition, too weak or too asthenic for more extensive procedures, in other words, where time is an important factor, this serous apron can be quickly sutured around the opening and the abdomen closed. In one of our clinics recently, where perforations were caused by an abscess from a gangrenous appendix, the patient not in a condition permitting resection, the omentum was wrapped around, and recovery followed, the operator proclaiming at the time, in his usual forcible manner: "Should obstructive adhesions form, two operations and a live patient are better than one operation and a mortuary."

2. To repair punctures in the mesentery.

3. For the protection of raw surfaces to prevent adhesions.

4. In excision of hepatic tumors the omentum may be utilized to advantage to give a broad base for the hemostatic suture of the excision wound.

5. In drainage of the common bile duct, wrap the omentum around the drain to prevent leakage. Also where a part of the common duct has been removed, a new duct may be constructed of omentum.

6. For the relief of pyloric stenosis, cut through the stenosed area and lay the omentum over the wound.

7. Use the omentum to strengthen lines of abdominal vascular suture.

8. In all resection of bowel and anastomosis wrap the free border of the omentum around. Where resection must be done in the least possible time, the two ends of the gut may be approximated by a single through-and-through suture and the omentum quickly placed around the wound with a saving of minutes.

9. We have shown that the omentum can be used to prevent gangrene; therefore in strangulation of the gut from numerous conditions, as for example, strangulated hernia, volvulus, etc., where there is doubt as to the viability of the gut, the omentum may have one of its greatest fields of usefulness; likewise in mesenteric thrombosis, where there is doubt as to the blood supply to a certain area.

The results of our work have been so uniformly positive and convincing that we feel no hesitancy in advancing our findings, with a hope that this work may be further enlarged and eventually prove of practical operative value to the surgeon.—(H. F. S.)

Klienberg, S. **Supernumerary bones of the foot.** Ann. Surg., April, 1917.

The author deals with the supernumerary bones of the foot, which have been erroneously diagnosed as fractures and irregularities in outline, interpreted as evidence of inflammation.

Three hundred and fifty x-ray plates were examined, and of this number 62 showed supernumerary bones. The following table shows their relative frequency:

	Cases.	Bilateral.	Per cent.
Os trigonum	19	6	5+
Os tibiale externum	12	4	3½
Os peroneale	20	8	5+
Os vesalii	4	2	1+
Secondary os calcis	7	....	2

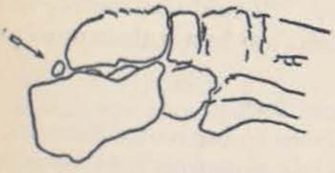

Fig. 1.—Os trigonum.

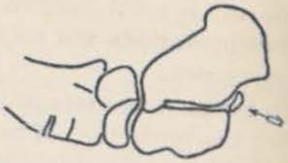

Fig. 2.—Os trigonum.

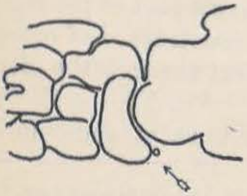

Fig. 3.—Os tibiale externum.

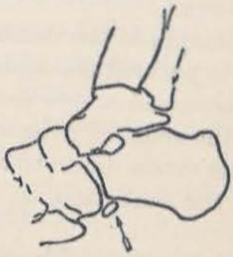

Fig. 4.—Os peroneale.

Os trigonum (figs. 1 and 2). "This bone, like all other supernumerary bones, is characterized by regularity in outline. It may be small or large, may vary in shape from oval to circular or triangular and may be fused with the astragalus or distinct from it. Its position is constant, being directly behind the astragalus."

Os tibiale externum (fig. 3). "This bone is usually oval in outline and situated on the inner side of and slightly behind the scaphoid."

Os peroneale or peroneum (fig. 4). "This bone is placed on the outer side of the cuboid. It is a sesamoid in the tendon of the peroneus longus muscle."

Os vesalii or vesalianum (fig. 5). "This bone is placed at the proximal extremity of the fifth metatarsal."

Secondary os calcis (fig. 6). "This was never seen as a distinct bone, but in seven cases there was an unusually long projection of bone in the interval between the astragalus, scaphoid and cuboid that corresponded with what is described as a secondary os calcis."

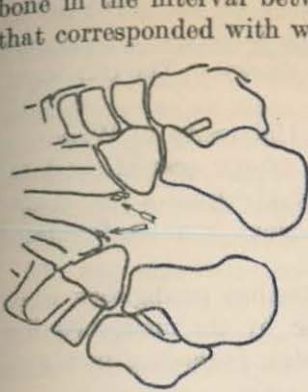

FIG. 5.—Os vesalii, shown by 2 vertical sections, plantar to plantar surface.

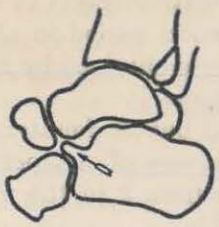

FIG. 6.—Secondary os calcis.

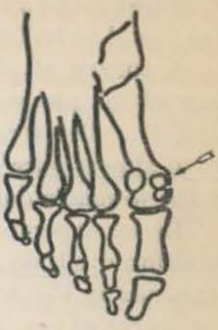

FIG. 7.—Sesamoid bones in big toe tendon.

Sesamoids in the big toe tendon (fig. 7). "There are usually two sesamoids near the distal extremity of the first metatarsal bones. Occasionally one of these is subdivided." The subdivided bone in the figure might be mistaken for a fracture. (H. F. S.)

HYGIENE AND SANITATION.

HILL, H. W. **Acupuncture: The best method of vaccination.** Am. Jour. Pub. Health, March, 1917.

"The arm is washed with soap and water, then with alcohol, and finally with ether. A small drop of vaccine is deposited on the clean surface. The vaccinator's hand is closed upon the arm from behind so as to draw the skin tight in front and the sewing-needle point, held slantingly nearly parallel with the arm, is pressed against the skin through the drop of vaccine. Then it is that one one-thousandth of an inch of the point sinks through the upper layer of the skin carrying the vaccine with it. The needle is instantly withdrawn and another puncture exactly like the first is made close beside it until a dozen punctures are made in the space of one-sixteenth of a square inch or less. The whole process of puncture takes perhaps 15 seconds. At once with a bit of sterile gauze the surface vaccine is removed and the sleeve drawn down."

The author claims that the method is rapid, painless and effective, giving in one series a hundred per cent of takes in the unprotected. Where the subject has been vaccinated or had smallpox, the puncture will redden, swell and be slightly itchy for a day or two. This is the anaphylactic reaction. Three sets of punctures are best, one at each angle of an equilateral triangle having sides 2 inches long. (ED.)

PETTIBONE, D. F., BOGART, F. B., and CLARK, P. F. **The bacteriology of the bubble fountain.** Jour. Bact., 1 (1916), No. 5, pp. 471–480, fig. 1.

The investigation here reported was made as the result of an epidemic of streptococcus tonsillitis, in which bubble fountains were suspected to be a factor in transmitting the disease. The city water was found to be free from streptococci.

"A survey of all the fountains of the University of Wisconsin showed the presence of streptococci in over 50 per cent of the total number. The streptococci varied in abundance from a few chains to an almost pure culture obtained by swabbings from the fountains in the woman's dormitory.

"In an experimental bubble fountain, Bacillus prodigiosus when introduced either by means of a pipette or by the moistened lips remained in the water from 2 to 135 minutes, depending partly on the height of the 'bubble.'

"Most of the organisms are flushed away, but some remain, dancing in the column much as a ball dances on the garden fountain, even though the bubble be increased to the impractical height of 4 inches.

"To avoid the difficulty always present in the vertical column a simple fountain with a tube at an angle of 50° from the vertical was constructed. B. prodigiosus was never found in the plates from this type of fountain, even when samples were taken immediately after the introduction of the organism. * * * It is believed that this type of fountain should be generally adopted. Its simplicity, low cost of construction, and freedom from lurking danger should recommend it to all." (E. W. B.)

PARK, W. H., SCHROEDER, M. C., and BARTHOLOW, P. **A sanitary study of condensed milk.** N. Y. Med. Jour., 102, 1915, No. 22, pp. 1073–1083.

The investigation herein reported concerns the bacterial content of the milk used in preparing condensed milk; the process used in condensing milk with reference to its effect on the bacteria; a bacteriological and chemical examination of the finished product.

Evaporated milk contained fewer bacteria than condensed milk, probably owing to the higher temperature used in its manufacture. Sweetened condensed milk showed the following variations in composition: Cane sugar, from 33.15 to 49.85 per cent; milk sugar, 7.57 to 15.34 per cent; protein, 6.73 to 13.50 per cent.

The data of the experiments and clinical observations are summarized in part as follows:

"The value of sweetened condensed milk depends upon the care and cleanliness used in manufacture.

"There is a want of evidence that the bacterial or chemical constituents are capable of affecting the health. Only the use of the best quality of sweetened condensed milk is to be commended in the feeding of infants.

"Sweetened condensed milk, when carefully prepared from whole milk, has special indications as an infant food. They may be thus expressed: Many infants are unable to digest the fat of cow's milk, even when two or three volumes of water are added. In such cases the half-digested curds of casein are vomited. The change in these circumstances to sweetened condensed milk allays the vomiting. These facts are well established clinically.

"Sweetened condensed milk has generally a constipating effect."

The opposite view that it produces diarrhea seems to be wanting in evidence.

"Clinical evidence ... (indicates) ... that the intestinal irritation caused by milk is an effect of the action of the liquid portion when freed of fat, sugar, and protein."

(E. W. B.)

Dickson, E. C. **Botulism, an experimental study.** Jour. Am. Med. Assn., 1915 No. 6, pp. 492–496.

This is a preliminary report of laboratory investigation which was suggested by an epidemic of botulism apparently caused by eating home-canned string beans. It was desired to determine experimentally whether a medium containing animal protein is necessary for the growth of Bacillus botulinus and the development of its toxin, as is generally believed, and in addition to obtain more information regarding the lesions produced in the body by the toxin. Although botulism is generally spoken of as a type of meat poisoning, the author cites a number of cases of this disease which were caused apparently by eating spoiled vegetables or fruits.

To determine whether the toxin of B. botulinus would be developed in a vegetable medium, about 1 mil. of a suspension of the organism in normal salt solution was injected into a number of cans of high-grade commercial string beans. The cans were then resealed and allowed to incubate at room temperature for periods varying from 3 to 12 months. After incubation of the cans, aerobic and anaerobic cultures of their contents were made on various media and portions of the fluid contents were injected into laboratory animals (guinea pigs, rabbits and cats). Pure cultures of B. botulinus were obtained from 6 of the 12 cans of beans inoculated. Of the 45 animals injected with the contents of the cans, 16 died and a number of others showed symptoms of botulism. Infusions of canned string beans, canned peas, pork and beef were also inoculated with the same strain of B. botulinus and with another strain as a control and all incubated at 22° to 28 C. Inoculations of other animals were made from these infusions, and, although all the data of this series are not complete, 22 of the animals inoculated died.

It is pointed out that since B. botulinus is an anaerobic organism which develops and produces its toxin best in the dark and at a temperature of 22° to 28 C., canned goods afford a favorable medium for its growth. In view of the results of these experiments and the fact that spores of B. botulinus withstand a temperature of 85 C. for nearly a half hour, the author emphasizes the fact that great pains should be taken to secure the sterilization of canned fruits and vegetables, as well as meats. This is especially true in home canning, as in commercial canning the high temperatures and time employed in processing are generally sufficient to kill these spores.

The general conclusions drawn from the investigation are in part as follows:

"The presence of animal protein is not essential for the development of the toxin of botulism. The toxin may be produced in a medium made from string beans or from peas. An acid reaction of as much as 3.2 per cent to phenolphthalein does not prevent the formation of the toxin."

(E. W. B.)

OSBORNE, T. B., MENDEL, L. B. et al. **Protein minima for maintenance.** Jour. Biol. Chem., 1915, No. 2, pp. 241–257, fig. 1.

In continuation of previous work the authors report the results of feeding experiments with laboratory animals (rats) to determine the minimum amounts of protein required for maintenance. By altering the protein content of the food, including different proportions of lactalbumin, casein, edestin, milk proteins and gliadin in a basal ration supplying an abundance of total calories, it was possible to note how the rats actually responded to the different diets.

Additional experiments, as yet incomplete, are described in which a limited, weighed amount of food was supplied daily and eaten completely. The effect of the different proteins was studied comparatively by reducing the amount of protein in the ration until growth ceased or a gradual decline in body weight occurred. The conclusions drawn are in part as follows:

"Ranges of 7 to 15 mg. of lactalbumin per gram of rat per week represent minima lower than those found for casein, edestin, milk proteins, or gliadin, not to mention the impossibility of maintenance with zein. * * *

"The different proteins are, with a few exceptions, not so widely divergent in their general amino-acid make-up as to lead us to expect wide differences of protein minimum requirement, aside from a few striking examples. In the case of growth, with its greater need of protein units, the divergencies of the proteins may manifest themselves more conspicuously than in mere maintenance. The apparently greater efficiency of lactalbumin, in contrast with the other proteins recorded above, is in harmony with the observation of the apparent economy of this protein as a supplement to deficient rations."

(E. W. B.)

CAMPBELL, H. C. **Comparison of the bacterial count of milk with the sediment or dirt test.** U. S. Dept. Agr. Bul. 361, 1916.

The author gives results of an experiment to determine whether the sediment or dirt test can be wholly relied upon as a means of detecting insanitary milk at milk-receiving stations. In the experiment the Gerber, the Wizzard and the Lorenz (E. S. R., 23, p. 180) apparatus were used. Pint samples of milk were collected on the railroad station platform from the milk cans as they arrived from various farmers. After preparing plates, sediment tests were made and the disks were compared with the bacterial counts.

Comparing the bacterial count with the Gerber sediment test with unfiltered market milk, it was found that "some samples had a high bacterial count, yet tested 'good' or 'fair' with the sediment test, while others which had a low bacterial count tested 'medium' or 'bad.'" With the Wizzard sediment test, one sample classed as "good" by the sediment test contained 4,102,000 bacteria per cubic centimeter. With the Lorenz sediment test one sample with a bacterial count of 768,000 tested "fair" by the sediment test, and one with a count of 7,200 bacteria per cubic centimenter tested "bad."

In comparisons with filtered milk 10 samples out of 20 filtered through 4-ply cheesecloth varied in bacterial count from 24,000 to 639,000 per cubic centimeter. Ten average samples out of 20 filtered through one ply of canton flannel varied in bacterial count from 18,000 to 316,000 per cubic centimeter. Ten average samples out of 20 filtered through 1-ply ordinary absorbent cotton, covered above and below with 1-ply cheesecloth, varied in bacterial count from 31,400 to 760,000 per cubic centimeter. Every sample of filtered milk was classed as good by the Lorenz sediment test.

It is concluded that the result of a sediment test is no criterion as to the kind or number of bacteria contained in the milk. The various sediment tests, while applicable in roughly estimating the quantity of sediment in unstrained milk, can not be used as the sole means of determining the hygienic conditions under which the milk was produced. Sediment testers are deemed of little value in estimating the degree of contamination in milk strained through the substances mentioned. The Lorenz apparatus is considered the most convenient and practical for demonstrating dirt in milk.

(E. W. B.)

MILLER, J. A., and NOBLE, W. C. **The effects of exposure to cold upon experimental infection of the respiratory tract.** Jour. Exper. Med., 24, 1916, No. 3, pp. 223–232.

The experiments here reported are part of a series carried out by the New York State Ventilation Commission to determine the physiological effect of low temperatures. Laboratory animals (rabbits), after being subject to sudden changes of temperature from hot to cold and cold to hot, were inoculated by spraying the mucous membranes of the nose and throat with a live culture of Bacillus bovisepticus, an organism pathogenic to rabbits. The following conclusions are drawn from these experiments:

"Respiratory infection of rabbits with B. bovisepticus (snuffles) is favored by chilling the animals after they have been accustomed to heat.

"The character of this disease, which occurs frequently in rabbits under natural conditions, makes the application of the experimental results to similar respiratory conditions in man less open to objection than in similar experiments with other infections.

"The weight of experimental evidence, including * * * (that of the authors), does not justify the elimination of exposure to cold as a possible though secondary factor in the incidence of acute respiratory disease.

"From the limited data of * * * (the) * * * last two experiments it is suggested that any marked change of temperature predisposes rabbits to this infection, the severity of which varies with the amount of change, and that a change from low to high temperature has even more effect than that from high to low."

(E. W. B.)

PATHOLOGY, BACTERIOLOGY AND ANIMAL PARASITOLOGY.

NOGUCHI, H. **Spirocheta icterohemorrhagica in American wild rats and its relation to the Japanese and European strains.** Jour. Exper. Med., Vol. xxv, No. 5.

The principal points brought out in the present article are the following:

(1) Wild rats captured in this country carry in their kidneys a spirochete which possesses the morphological and pathogenic properties characteristic of Spirocheta icterohemorrhagica discovered by Inada in the Japanese form of infectious jaundice.

(2) Cultures of the American, Belgian and Japanese strains of the spirochete were obtained by a special technique described, the first two strains having been cultivated artificially for the first time.

(3) Animals actively immunized against the Japanese strain resist inoculation, not only of the same strain, but also of the Belgian. and American strains. The Belgian strain produces immunity equally effective against all three strains. Experiments to ascertain

whether the immunity afforded by the American strain also protects against the Japanese and Belgian strains are in progress.

(4) These findings warrant the conclusion that the spirochetes designated here as the Japanese, Belgian and American strains are probably identical.

(5) On account of its distinctive features, a new genus, Leptospira, has been suggested as the designation of this organism.

(R. H. L.)

Schöbl, O. **Cholera culture injected into the gall bladder and the influence of bile upon cholera carriers in experimental animals.** Philippine Jour. Sc., July, 1916.

In the first article the author gives a record of a series of experiments which show that the inoculation of a relatively small amount of cholera vibrios into the gall bladder may produce carriers in animals, but the results are not as regular as they are when larger amounts are used for inoculation and that the amount of inoculum seems not to have any direct bearing in the duration of the carrier state in animals.

The second article gives a record of experiments done in the following way:

Thirteen guinea-pigs of the same size were inoculated simultaneously. One-tenth of one slant of cholera culture was injected into the gall bladder. After the inoculation seven of the animals were given one cubic centimer of ox bile by mouth every third day. They were killed and examined at intervals. The remainder of the experimental carriers, six in number, which received no bile, were taken as controls. All of the seven experimental cholera carriers fed on bile were found positive from 16 to 35 days after the inoculation, while only three of the six controls were found positive during the same period.

This experiment would seem to show that the administration of bile, a cholagog "par excellence," tends to prolong rather than to shorten the duration of the state of cholera carrier.

(R. H. L.)

Judd, C. C. W. **The diagnosis of melanoma (melanotic sarcoma) by means of the resultant effusions.** Am. Jour. Med. Sc., May, 1917.

The author prefaces his article with the following: "Melanoma, though not a rarity, is a malady of more than passing interest, both clinically and pathologically, and the diagnosis, by no means difficult histologically, is not always recognized without surgical intervention during life. Any method, therefore, which throws light upon its presence without the necessity of an otherwise advisable exploratory operation saves the patient a needless ordeal and is a welcome aid to the internist."

The author gives the history of two cases with the laboratory findings in the effusions from the pleural and peritoneal sacs taken at times in the clinical course of the disease when there was absence of the usual diagnostic signs, e. g., melanuria, characteristic pigmentation of the skin, or suspicious tumor of the skin or choroid.

Macroscopically the fluids were almost identical in appearance. When agitated they were quite opaque, even in relatively thin layers when viewed by transmitted light. On sedimenting there was a dense dark, brick-dust layer at the bottom, while the supernatant fluid, though intensely pigmented, was clear and appeared dark reddish brown in color. The surface layer was slightly iridescent, with a predominant greenish tone. The foam, obtained by shaking, had a tendency to a pinkish hue in Case I and a dirty olive green in Case II. When the light fell directly upon the fluids in both thick and relatively thin layers it was almost black, so intense was the pigmentation. Here too a slight difference was noted, Case I being of a slightly reddish and Case II of a greenish tinge. They appear not unlike crude petroleum with their deceptive play of iridescent colors. In very thin layers viewed by direct light the fluids were reddish to greenish yellow.

The supernatant fluid when tested with a strong solution of ferric chloride showed no reaction for melanogen, but on the addition of bromine water a yellow cheesy precipitate was formed which became much darker on standing, finally becoming almost black, thus indicating that the transformation from melanogen to melanin had been complete *in vivo*. Tests for bile pigments were negative.

Microscopically the sediment showed not only red blood corpuscles, epithelial cells and numerous leukocytes, but also many granules of melanoma. These cells were round or oval for the most part, occasionally polygonal. The round or oval nucleus was usually centrally placed, frequently showed mitosis and occasionally was extruded from the cell. Often the nucleus was completely hidden by the closely packed brown granules included in the cytoplasm of the cell. The granules themselves were coarse, irregular in size and shape and of an intense brown color. When stained the entire cell was basophilic, the granules intensely so. The separate granules were apparently bound together by a delicate basophilic recticulum.

The specific gravity of the fluids varied between 1.024 and 1.030.

(R. H. L.)

TAYLOR, H. D., and MURPHY, J. B. **The rôle of lymphoid tissue in the resistance to experimental tuberculosis in mice.** Jour. Exper. Med., vol. xxv, No. 5.

This is an account of four sets of experiments on mice. In the first two sets a number of mice were immunized with defibrinated mouse blood. The immunity to mouse carcinoma was tested by inoculating mouse carcinoma into the above and into controls. The immunized mice and another set of controls were inoculated intraperitoneally with cultures of bovine tubercle bacilli. It was found that the mice immunized to mouse carcinoma lived approximately twice as long as the controls. In the second two sets of experiments a series of mice that had been rendered and proved immune to mouse carcinona were x-rayed sufficiently to reduce the lymphoid tissue, and then these, together with a series of normal mice as controls, were inoculated intraperitoneally with cultures of bovine tubercle bacilli. It was found that the normal controls lived approximately twice as long as the cancer-immune mice that had been x-rayed sufficiently to reduce the lymphoid tissue.

In a former series of experiments the authors had shown that mice rendered immune to mouse carcinoma displayed a pronounced lymphocytosis lasting several weeks. With the comparative immunity of cancer-immune mice to tuberculous infection and the comparative susceptibility of mice x-rayed to such a degree as to cause a marked reduction of lymphocytes, this series of experiments would seem to show that the lymphocytes play a large rôle in immunity to tuberculous infection.

(R. H. L.)

TAYLOR, F. E., and MCKINSTRY, W. H. **The relation of peridental gingivitis to Vincent's angina.** Brit. Med. Jour., March 31, 1917.

In a brief résumé it is pointed out that Vincent, in 1898, stated that the mucous membranes of the mouth and gums might be involved by ulcero-membranous inflammatory affections, as well as the pharynx and tonsils.

Miller, an American dental surgeon, is credited with having first seen and described the organisms (spirillum and B. fusiformis) although Vincent's name is usually associated with them.

The writers have found the organisms present in 300 cases of all forms of ulcero-membranous inflammation of the mouth. Besides the frank cases of ulcero-membranous gingivitis associated with the usual Vincent's angina, there may be cases of infection limited to the margin of the gums and about the teeth. In each of 70 cases of Vincent's angina they found an associated peridental gingivitis and in 150 cases of fuso-spirillary gingivitis there were 70 cases of Vincent's angina. In all cases the gums had been involved, bleeding after the use of a tooth brush. In some cases the condition of the gums had existed for years prior to the involvement of the tonsil or pharynx.

(G. F. C.)

OLITSKY, P. K. **The nonfilterability of typhus fever virus.** Jour. Infect. Dis., April, 1917.

The writer states that "the basis for the assertion that the virus is filterable is a single, very doubtful experiment of Nicolle, Conor and Conseil." He also cites the experiment of Wilder who continued the work of Ricketts and Wilder. He believes that the elevation of ½ C. between the 16th and 18th day in one monkey of four inoculated with filtered serum and the subsequent inability to inoculate the same monkey with unfiltered serum does not establish the claim of Nicolle. He regards the rise of temperature for two days as normal for monkeys and the fact of subsequent failure to inoculate with unfiltered serum as due to natural immunity, as shown by Anderson and Goldberger, to be present in 22½ per cent of monkeys. Likewise he explains the work of Wilder on the ground that the monkey used was immune or that the serum used was avirulent.

Olitsky used guinea pigs in his experiments and found that filtered serum would not give rise to the disease or protect the animal from subsequent infection, and that unfiltered serum would cause the disease and immunize the animal against subsequent infection.

(G. F. C.)

BLAKE, F. G. **The classification of streptococci.** Jour. Med. Research, March, 1917.

Blake reviews the literature and discusses the two methods of classification used most extensively: (1) The appearance of colonies on blood-agar plates. (2) The carbohydrate fermentation method. For blood-agar plate work he recommends the use of 5 per cent of defibrinated blood, even mixture of blood and agar; sufficiently well separated colonies and observation at the end of 24-hour incubation. He says that much of the confusion which has arisen in reports on the carbohydrate method has been due to the fact that blood-agar plates were not used for primary differentiation. He used one or two drops of rabbit's bile in 0.5 mil of normal salt solution to determine that the nonhemolytic colonies were not bile soluble (differentiation from pneumococcus). He did a limited number of agglutination tests and believed that such tests lend weight to the value of differentiation by blood-agar plates, but that at present such tests were unavailable. His work with many strains has led him to the conclusion that the use of blood-agar plates followed by carbohydrate fermentation tests using only lactose, and mannite give best results. One per cent of the test carbohydrate in 2 per cent peptone meat infusion broth, reaction 0.0 to 0.5 plus to phenolphthalein, sterilized by fractional method. Litmus or Andrade's decolorized fuchsin should be used as an indicator.

TABLE III.

Streptococci (Gram positive, bile insoluble cocci in chains.)
Blood—agar:
  (1) Hemolysis—Str. hemolysans.
  (2) Methemoglobin and Indifferent.
    Str. Viridans.
      $(a)\left\{\begin{matrix}\text{Lactose }+\\ \text{Mannite}-\end{matrix}\right\}$ Str. buccalis.
      $(b)\left\{\begin{matrix}\text{Lactose }+\\ \text{Mannite}+\end{matrix}\right\}$ Str. fecalis.
      $(c)\left\{\begin{matrix}\text{Lactose }-\\ \text{Mannite}-\end{matrix}\right\}$ Str. equinus.

[G. F. C.]

EYE, EAR, NOSE AND THROAT.

SULLIVAN, J. J., Jr. **The symptoms of empyema of the maxillary sinus; a simple operative method for its relief.** Pennsylvania Med. Jour., Vol. xx, No. 7.

ROUTINE PRACTICE IN EVERY CASE.

1. Examine the nose before and after contraction. Cocain and adrenalin.
2. Syringe the nose with normal salt solution, collecting the return fluid in a black pus basin. If pus has been present, look for its reappearance.
3. Transillumination with the author's frontal sinus and antrum lights.
4. Roentgen ray and compare with transillumination markings of the sinus.
5. Position (Escat) head down, side examined uppermost.
6. Puncture and irrigation of the maxillary sinus under the inferior concha.
7. Suction should be used for all the sinuses.

STEPS IN THE OPERATION ON THE ANTRUM OF HIGHMORE.

1. Cocainize the inferior concha under and above it, also the septum opposite it.
2. Infract thoroughly the inferior concha upward, using a special speculum or Luc ethmoid forcep.
3. Remove the wall, using a Whiting No. 2 or 3 long mastoid curette, a Gleason rasp, small chisel or trephine.
4. Entrance with the curette should be about the middle and at the point of attachment of the bone with the lateral wall.
5. The floor of the sinus should be lowered to about that of the nose.
6. Pack with gauze either iodoform or bismuth, remove within 24 hours and the sinus is then painted with 50 per cent argyrol.

(G. B. T.)

IMPERATORI, C. J. **A case of septic arthritis following submucous resection of the nasal septum.** Laryngoscope, Vol. xxvii, No. 3.

On December 23, 1915, D. B. had a submucous resection operation taking no longer than 10 minutes. No adrenalin was used and gauze sponges kept the field clean. Nostrils packed with vaseline gauze; patient returned to ward. Packing removed in 15 hours; patient left hospital. Returned in one week, during the night; temperature 105 F. and pain left knee, latter having started two days previously. He had been too weak to come to the hospital and had been attended by his family physician. There had been some bleeding from the nostrils, which was treated by medicine and later by packing to control hemorrhage. Septal abscess suspected but not found. Later flaps opened again and a little sero-sanguineous fluid escaped.

There was fluctuation left knee joint on the second day after his return to the hospital. The joint was opened, extensive destruction of the cartilage was found, and considerable pus. Gradual recovery occurred but a resection of the joint was necessary.

(G. B. T.)

WEINSTEIN, J. **Nature and control of hemorrhage in naso-pharyngeal operations.** Laryngoscope, Vol. xxvii, No, 3.

The procedures involved in dealing with naso-pharyngeal hemorrhage are preventive, medical and surgical.

Study of the general condition may reveal any constitutional conditions favoring a hemorrhage. Further prevention is in the choice of operative method best adapted to the individual case.

The following hemostatic measures are advocated in the order named, in cases of post operative hemorrhage following operations upon the tonsils and lateral wall of the pharynx.

1. Application of Mikulicz's compression.
2. Sewing together of the palatal arches.
3. Compression of the common carotid artery.
4. Ligation of the common carotid artery or its branches.

Based upon the commonly accepted causes of hemorrhage, high blood pressure, persistent vasodilatation and delayed blood clotting, thereapeutic measures are of three kinds:

1. Those equalizing the circulation and lessening the intravascular pressure at the bleeding point.
2. Those contracting the vessel itself.
3. Those decreasing the coagulation time of the blood.

According to Marawitz, a substance which he calls thrombokinase is present in all body tissues and especially in blood platelets. Prothrombin, antithrombin, calcium salts, and fibrinogen are constantly present in normal blood. When the tissues are injured, thrombokinase combines with the calcium salts, and prothrombin to produce a new substance called thrombin, which with the fibrinogen forms fibrin or clot.

Howell assumes that while the elements of coagulation are all present in the blood, there is normally sufficient antithrombin to prevent clot formation. Cellular injury releases a substance that he terms thromboplastin that binds the antithrombin and permits the formation of a clot. Antithrombin is formed in the liver. Severe hemorrhage decreases clotting time according to Gray and Lunt. Injections of adrenalin chlorid decrease the clotting time one-half or one-third the former duration. Emetin is used by the author as a routine who claims that by hypodermic injections of one-half grain 15 minutes before making tests, bleeding time is reduced by one-third at least. Pituitrin gave practically the same result. Coagulen Ciba, discovered by Prof. Kocher, of Berne, and his assistant, Fonio, is described by them as an extract of blood platelets containing cytozym, which when added to animal blood combines with serozym existing in the blood and forms thrombin or fibrin ferment.

The use of thromboplastin (tissue juice, prepared from the liver and brains of cattle) has been made a routine procedure in the department of health, nose and throat clinics, according to Dr. J. T. Cronin, of the New York department of health, and in no case has the operator or nurse been obliged to return to the clinic to care for a bleeder since the practice began.

Coagulose, made by precipitating normal blood and said to contain the fibrin ferment necessary for clotting blood, has given good results in naso-pharyngeal hemorrhage. Frey, in 1898, treated hemorrhage with horse serum. Weil reported a case in which the coagulation time was reduced from 4½ hours to 40 minutes by this treatment.

(G. B. T.)

SKILLERN, R. H. **Sphenoid sinus: Present-day value of surgical procedure.** (Jour. Laryngol., Rhinol., and Otol., Vol. xxxii, No. 2.)

Operations may be divided into intranasal and extranasal, the latter never being used except when other sinuses are involved. The intranasal operation is performed in sphenoid wall. Schaffer uses a sharp curette, Spiess an electric trephine, Grünwald a conchotome, Andrews a curved knife, Grayson a hand burr; but until Hajek, in 1904, published his paper, the operation had not assumed a definite, well recognized form.

He removes the posterior half of the middle turbinate by means of scissors and snare, breaks down and removes piecemeal the posterior ethmoid cells, exposing the anterior sphenoid wall. This is broken down and removed by heavy specially constructed bone forceps.

Modifications consist in preserving the middle and superior turbinates and enlarging more or less the natural opening.

Indications: Since the conservative methods are but steps in the radical and doubtful cases should be first treated conservatively the positive indications for the radical treatment are:

1. Typical pain, profuse discharge, symptoms of retention and when permanent pathological changes are probable.
2. When orbital or cerebral complications threaten or have occurred.
3. When the conservative method has been tried and found ineffective in bringing about a cure.
4. In mucocele or pyocele of the sinus of long standing.

POSSIBLE ACCIDENTS DURING OPERATION.

1. Hemorrhage, from sphenoidal branch of the nasopalatine in the floor of the sinus. The cavernous sinus lies laterally.
2. The escape of cerebro-spinal fluid may take place.
3. Packing too tightly with gauze. This will promptly provoke alarming symptoms which will not disappear until the packing is removed.

After treatment: Provide sufficient drainage and aeration. If the openings tend to close touch up the edges with silver nitrate.

Immediate and after results: Conservative methods, such as simple enlargement of the ostium, will often give brilliant results.

Radical methods in the severest cases will produce marvelous results. Meningeal symptoms and cerebral manifestations rapidly begin to clear up. A large percentage of the sinuses recover entirely, but the resistance is lowered and reinfection occurs with subsequent attacks of coryza and the re-formation and secretion of pus. This, however, clears up under appropriate treatment.

(G. B. T.)

REPORTS.

SUGGESTIONS FOR OFFICERS ORDERED TO GUAM.[1]

By A. E. PECK, Surgeon, United States Navy.

An officer ordered to Guam should cable as soon as possible to the officer he is to relieve or to some other person to engage for him a house and servants. Western Union or Navy codes may be used; the Sellers code is best adapted for the purpose, but there may be no copy in Guam at times.

It is not always possible to secure just the kind of house desired, and it may be several months before one becomes vacant, hence the importance of cabling early. The houses are mostly of three rooms, renting for $20 to $30 a month.

Servants: Most white residents of Guam employ a cook and a house boy. If there are children, a native nurse is desirable. A Chamorro cook is paid $15 to $17, a Filipino about $20 and a Chinaman or Japanese $25 a month. There are seldom enough good cooks to supply the demand. A house boy gets $5 to $9 and a native nurse $4 to $10. Washing is done by the native women and costs $1.50 to $2.50 a month for each person.

A full outfit of furniture for the house should be brought, as it can not be purchased reasonably in Guam. Cheap furniture is the best and it can be sold for practically the cost price when leaving. It is simplest to purchase it in San Francisco and have it delivered direct to the transport dock. The outfit should include all kitchen gear, stove and ice box; a small coal-oil stove will be found very useful. Do not bring the best linen, silver, or dishes, as they receive very severe treatment at the hands of laundress and house boy. When the *Supply* goes to Manila it is possible to get Filipino furniture very reasonably.

Clothing: White uniform is worn exclusively by officers. Uniforms can be purchased more reasonably in Guam than in the States. It is well to have a khaki outfit for hiking and hunting. Ladies will require many light dresses and some evening clothes such as are worn in America. Silks and chiffons are apt to disintegrate quickly. Plenty of low white shoes, sufficient for the entire tour of duty, should be brought; leather-sole, rubber-sole and tennis shoes are used. Do not bring the choicest jewelry, as it is a temptation hard for the native servants to resist.

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[1] Extract from Annual Sanitary Report, Guam, Ladrone islands, 1916.

An automobile or motorcycle with side car will be found very useful, as there are many miles of improved roads. Spare parts and accessories can be obtained here for Fords but cost much more than at home. For other cars a good supply of tires and spare parts should be brought, as it takes three to six months to get them from the States. If you bring a motorcycle get the 4-cylinder type as it is much better for the rough roads and steep hills and costs about the same as the 2-cylinder. There is a good market for used cars when leaving; a second-hand car sells for about as much here as a new one at home.

When bringing a family, a sewing machine, either hand or foot driven, is a necessity. A liberal supply of machine needles protected in oil should be brought, as none are obtainable in Guam. A piano, if cheap and well seasoned, may be a good investment, an electric light inside keeping it in good condition. Expensive leather goods, furs, books and watches deteriorate rapidly in Guam.

There are shops, with a limited stock and rather high prices, where ladies' dress goods can be obtained soon after arrival of schooners. Dressmakers of mediocre ability are to be procured. Groceries and delicacies can be obtained from local agents of American firms at approximately double their cost at home. The commissary store carries a variety of foods sufficient for the average family. At certain times of the year the supply of green vegetables and fresh fruits is adequate, but for at least half of the year practically all the food is imported. There is no fresh milk for babies. Many young babies do not do well in Guam; they should be weaned from the bottle and be able to eat almost all foods before coming here where the dietary is limited. Practically all children get ascaris and hookworms, but do not suffer seriously from them. Older children thrive and are benefited by the outdoor life.

There is a private school for young children, but aside from that the native schools or home teaching must suffice.

The electric current is a 250-volt direct current and is available from 6 p. m. to midnight only.

There are deer and birds to be hunted and a shotgun is very useful. Several tennis rackets with a press and gut enough for several renewals, deep-sea fishing gear, bathing suit, camera (not film pack) and possibly a canoe will pay for themselves in pleasure.

There are two libraries with a fair assortment of books, principally historical and biographical, at the naval hospital and the marine post exchange. The officers' club subscribes for a number of magazines and newspapers.

Mail comes once a month. This is no hardship after the first month or two. It is desirable to subscribe to a number of periodicals and perhaps a newspaper.

FEEDING AND HOUSING RECRUITS, NEWPORT, R. I.[1]

By D. N. Carpenter, Surgeon, United States Navy.

The average complement for the month of April at the Naval Training Station, Newport, R. I., was 3,519. The total enlisted force on March 31 was 2,577. On April 30 the complement was 4,713. During the month of April, 5,075 recruits were received. There were 80 enlistments and 7 reenlistments and 1,789 enrollments in the Naval Coast Defense Reserve, all of whom were examined by the medical officers of the station.

The food at the station is excellent in quality and abundant in quantity. The messing arrangements have been changed to the cafeteria system, which is considered so satisfactory that it seems to solve the problem of providing hot meals for a large number of men with the least waste and in the least time. In barracks "B" 2,900 men are quickly and quietly served three times a day. Owing to the limited size of the kitchen it has been necessary to serve each meal in two sections. In good weather at this season the men take their plates out to tables outside of the barracks. When the men enter the line to be served conspicuous signs inform them: "If you do not get enough to eat come back for more." "Do not take any more food than you need." "Do not waste food."

The men in the Hospital Corps Training School occupy eight pavilion and a number of wall tents erected north of the old hospital building. There were on April 30, 352 hospital apprentices under training at that school, this large number being instructed in two sections, the lectures and laboratory work being repeated. It has been found possible to cover the entire work outlined in the curriculum at least once in a period of three months, and the course has never been shortened owing to the pressing need for the men in the service. A special class comprising men who have had previous drug experience or advantages in education enables such men to cover the course in a shorter time.

MALARIA AT TAMPICO.[2]

By W. C. Espach, Passed Assistant Surgeon, United States Navy.

Upon arrival at Tampico, Mexico, the health conditions of the town were found to be very bad. Mosquitoes were abundant, largely an Anopheline, Cellia Albimana. All possible care was taken immediately. Every opening in the ship was screened. Men slept on deck under triced-up nets and all men on watch after sunset were equipped with head nets, gloves and leggings.

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[1] Extract from Monthly Sanitary Report, Training Station, Newport, R. I., April, 1916.

[2] Extract from Annual Sanitary Report, U. S. S. *Nashville*, 1916.

On August 1 had the first case of malaria; from then until January 1 had a total of 306 cases, counting recurrences and reinfections. Fifteen men were infected by subtertian, the remainder were plasmodium vivax infections. By December 1 the daily admittance dropped very markedly, only one or two new cases coming in.

During the months of August, September, October, and November approximately 2,028 deaths were reported by the town health department. In the opinion of medical men of the city and of the American consul, this number represented about 60 per cent of the actual deaths. The bulk of them were caused by malaria. This year's mortality was the highest for about six years. The United States Public Health Service sent Surgeon Guiteras and Passed Assistant Surgeon Ridlon to Tampico to investigate the causes of this excessive mortality.

The cold and northers have cleared away the mosquitoes to a great extent, so that but few cases are looked for during the next three months.

WATER FILTRATION PLANT.[1]

By C. E. RYDER, Surgeon, United States Navy.

The liquid chlorine sterilizing equipment which was added to the filtration plant in September, 1915, and described in the sanitary report for last year has fully justified the expenditure. Before installation bacillus coli was shown to be present in approximately one-half of the examinations. Since the addition of this equipment the maximum number of colonies to the cubic centimeter has been never more than six and bacillus coli has been absent in all tests except one. The amount of water utilized on the station has been much in excess of the filtering capacity and in time of storm the lake water is distinctly muddy for a considerable distance from the shore, far beyond the intake opening. This muddy water is an additional tax upon the rate of filtration in the slow sand filter and at times it has been necessary to break up the *Schmutzdecke*, thus destroying the filter, as such. At the present time there is in progress of erection a mechanical or rapid sand filtration plant of the design of the International Filter Co. of Chicago, Ill., which is expected to be in operation late in February. The estimated capacity of this filter will be 1,000,000 gallons a day. This new 1,000,000 gallon rapid sand filter plant is being installed in the present north filter bed of the existing 200,000 gallon slow sand filter plant. It will occupy one-fourth of the old filter bed area.

The filter complete consists of a preliminary sediment basin with suitable baffles, a 250,000-gallon clear-water reservoir, two concrete gravity filter beds each having a filtering capacity of 500,000 gallons of water per 24 hours, pipe gallery, control equipment, chemical solution tanks for coagulation and chlorine equipment for sterilization, pumps, etc.

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[1] Extract from Annual Sanitary Report, Great Lakes, Ill., 1916.

The preliminary sedimentation basin and the 250,000-gallon clear-water reservoir are part of the old filtering equipment and are to be utilized in the new plant.

The two reinforced concrete gravity filter tanks are each 13 feet 2 inches by 14 feet 3 inches in area and are 8 feet deep; one is placed in the southwest corner and the other in the northwest corner of the existing north filter bed. The space between these basins is used as a pipe gallery and contains a 14-inch inlet for raw water with proper control valves which lead from the sediment basin; an 8-inch wash water line with control valves tapped into the high-pressure main giving clear filtered water for washing filters;. 6-inch filtered-water lines from filters through the rate controllers to a 14-inch line to reservoir; 10-inch drainage connections to the lake, all with proper control valves. Over the pipe gallery is the operating platform from which all valves are operated for complete control of the filters. Upon the platform is also located the blower for supplying air for agitating the sand beds and the loss of head gauge which indicates when it becomes necessary to clean the filters.

Each filtering unit contains along its bottom in a north and south direction an 8-inch by 6-inch cast-iron water manifold, having on each side 2-inch cast-iron pipes spaced 6 inches on centers; this manifold system has brass strainers 6 inches apart connected to the same. This gives 26 rows of strainers 6 inches apart with 30 strainers in each row; each strainer contains 33 holes of three sixty-fourths inch diameter, which constitutes the water-collecting system.

Extending from the top of the wing wall on the inner end of the filter basin to the outer wall are two wrought-iron collecting troughs which serve to distribute the incoming raw water and to collect evenly the waste water during washing.

The filtering material consists of a 10-inch layer of gravel, consisting entirely of rounded pebbles passing a five-eighths inch screen and retained on a three-sixteenths inch screen and a bed of clean, hard, hard silicon sand 32 inches deep on the gravel having an effective size of not less than 0.35 millimeter nor greater than 0.5 millimeter and a uniformity coefficient of not less than 1.5 nor greater than 1.9.

Over the water manifold and under the sand bed is installed the air manifold system consisting of a central header running in a north and south direction near the center of the bed, having one-half inch brass pipes with one-sixteenth inch holes on six centers on the under side extending to a header along each outer wall; the outer headers being connected to the sewer so water may be flushed through air system for cleaning.

The blower for supplying the air for agitating the beds is a 15-horsepower outfit of positive blower type capable of delivering 600 cubic feet of free air per minute at a pressure of 3½ pounds per square inch.

The alum solution tanks are two in number approximately 4 feet square and 4 feet deep; they are so constructed that alum is placed in a chamber with perforated bottom through which the alum in solution passes to the tanks. Connected to the tanks are lines to an orifice box for control of flow of solution, and from orifice box to the intake well where the alum solution is added to the water prior to being pumped to the sediment basin. Drains are also connected to the tanks for cleaning.

On the wall near the alum tanks is the liquid chlorine meter which feeds chlorinated water into the clear-water reservoir where the influent from the filters enters the basin. Liquid chlorine is purchased in 100-pound cylinders and is under a pressure of approximately 110 pounds per square inch. The cylinder is connected to the meter by a means of a flexible brass pipe through which gas is carried to the main valve; from here it flows through two reducing valves to give a constant flow for the meter. The control is by means of a needle valve and the amount of gas passing through the machine is indicated on a scale calibrated in ounces per hour by means of a colored glass float contained in a vertical glass tube. This tube is small at the bottom, increasing in size toward the top, so the greater the amount of gas passing through the higher will the float be held. After the gas passes the meter it goes through a check valve used to prevent water entering the machine and then into the hard-rubber absorption chamber, where it is absorbed by the water passing through the chamber and carried to point of application in the reservoir.

Operation of the plant when complete will be as follows: Water entering the intake well from the lake will be pumped through a 6-inch line to the sediment basin; alum solution from alum orifice box will be added at this intake well and receive considerable mixing in passing through the centrifugal pumps and 150 feet of 6-inch line on its way to the sediment basin. In the sediment basin, water will pass through baffles to further mix the alum and form the proper flocculent precipitate to produce the required amount of sedimentation. The flow through sediment will require from 3 to 10 hours, depending upon pumpage.

From the sediment basin the water will flow to the filter bed, where it will pass downward through the sand into the collecting system, from here through rate controllers into the main clear-water reservoir.

From the reservoir, water is pumped to the grounds by means of steam pumps located in power-plant basement.

When the filter bed becomes clogged, the same will be shown on the loss of head gauge, influent and effluent will be shut off and the line to sewer opened, the air turned on to break up the film on the top of the sand; wash water from system will be slowly turned on until a sufficient amount flows to thoroughly clean the sand. When clean, the air and water are shut off, the sewer line closed; effluent and influent valves are opened and the filter is again in operation.

TYPE OF BUILDING FOR TROPICAL HABITATION.[1]

By W. L. MANN, Passed Assistant Surgeon, United States Navy.

The quarters for officers and married enlisted men are inadequate both in character and extent. The bulk of the present quarters were built by the Spanish officials and are located in the industrial portion of the yard where the noise from the shops creates a well-marked nuisance to the occupants.

To successfully withstand the enervating effects of a tour of duty lasting 30 to 36 months in the Tropics comfortable and hygienic quarters are indispensable. It appears, from an economical standpoint, that it would be cheaper for the Governnent to provide sufficient quarters than to pay commutation for the same. When the question of improvement in health, contentment and efficiency of the personnel is considered, the Government would unquestionably obtain good returns for any expenditure on quarters.

Some of the quarters recently built are not considered adapted to this climate. It is recommended that the Navy Department appoint a board to carefully consider architectural plans and adopt a standard type of construction adapted to the demands of tropical conditions.

It appears that concrete double quarters, like those erected by the Army at Corregidor Island, would be desirable. It is estimated that wooden structures cost about 10 per cent for maintenance and repairs due to climatic conditions and tropical insects—white ants. Notwithstanding a slight initial increase of cost, therefore, it would seem that the concrete buildings of this type would prove more economical in the end, as well as cooler and more sanitary.

These remarks are occasioned by my noting the superiority, for tropical conditions, of the structures built by foreigners in China over the usual type seen in the Philippines.

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[1] Extract from Annual Sanitary Report, Cavite, P. I., 1916.

IMPROVEMENTS AT CANACAO HOSPITAL.[1]

By A. R. ALFRED, Medical Director, United States Navy.

During the year 1916, Hospital Steward Allen, under the direction of the medical officers, manufactured 127,075 mils of typhoid vaccine, nearly all of which was shipped in small ampoules to the American Red Cross Society for use in Siberia in immunizing prisoners of war. The total quantity shipped by the Canacao Hospital to the Red Cross Society during the latter part of 1915 and the first part of 1916 amounted to 40 gallons in small ampoules, the bulk of which had a capacity of 10 milliliters. Mr. Richard T. Evans, the secretary of the branch of this society at Pei Yang University, Tientsin, China, expressed in several letters his thanks for this valuable vaccine, which was without cost other than for material used and expenses incident to manufacture. Hospital Steward Allen should be highly commended for this work.

The recreation building is still used for instruction of the hospital corpsmen, as well as for Saturday evening moving pictures and for occasional amateur theatricals. Additional raised seats have been installed in the rear of the main hall. The hospital corpsmen of Canacao Naval Hospital won a prize (first) in the form of a silver cup each year during the carnivals of 1914, 1915, 1916 at Manila.

In September, 1916, many shrubs were procured for the hospital reservation from the Philippine Government free of cost. This was in accordance with Dr. Blackwood's plan in 1912 for beautifying the hospital grounds. Plants to the value of $900 were to be turned over to the hospital during a series of years. At the present time both shrubs and trees from seeds and clippings are grown on the reservation in considerable numbers, and very few plants from Manila will be required in future years, except some of the rarer types. More than 230 young palomaria trees are now growing on the reservation, either in bamboo tubes or in selected sites where large trees are desired, as along the water front and along the driveway between the main gate of the hospital and the radio station. All these have been grown from seeds from the two huge palomaria trees near the old hospital yard. This kind of tree withstands the wind and spray of typhoons very well, but grows very slowly. There are also over 80 banana shrubs and 90 papayas, some of the latter now bearing fruit. Resodding of lawns has been done during the proper seasons. Grass grows well except in the deep shade of trees, where it is necessary to renew the sodding every year.

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[1] Extract from Annual Sanitary Report, Naval Hospital, Canacao, P. I., 1916.

REJECTION OF ACCEPTED RECRUITS.[1]

By C. N. Fiske, Surgeon, United States Navy.

The increasing percentage of rejections at Marine Recruit Depot of applicants accepted throughout all districts west of the Mississippi River is a matter of considerable correspondence and misunderstanding, although the cause seems clearly due to official encouragement to lower physical standards, which at some recruiting stations seems to be translated into license.

During the four quarters our percentage of rejections has risen from 26.7 per cent to 27.2 to 31.1 to 32.5 per cent, respectively, and this despite the fact that all three medical officers in almost daily consultation are disposed to overlook (but record) many defects which were formerly deemed sufficient to reject, but are now passed in view of the desire to fill up the Marine Corps. I deem it my duty to commend the great and conscientious care and discretion (both in accepting and rejecting) which I have personally observed in Surgeon J. L. Neilson and Passed Assistant Surgeon R. I. Longabaugh, who have performed most of the Marine recruit depot work and who have been in the habit, throughout their tenure of that detail, of referring the many border-line cases to me for application of bureau and departmental policies.

In my opinion this work is so important that a surgeon of wide experience should devote his undivided attention to the marine reservation (barracks, recruit depot and naval prison) for the recruiting stations are certainly accepting applicants whom every medical officer experienced with marines at sea and on foreign service must know would break down. The less experienced recruiting surgeons do not see here the 10 per cent of ears from which considerable or large plugs of wax must be removed and through which they are supposed to have found intact ear drums. They do not seem to realize that as Vedder has shown in the Army but 72.6 per cent of accepted recruits give negative Wassermann blood tests; that the age of marine recruits approximates more nearly that of the Army than that of the Navy which Passed Assistant Surgeon Munger, United States Navy, has found to give 98.4 per cent negative tests. The positive cases can usually be discerned by careful attention to indurated lymph nodes throughout the body, scars on genitals and by taking a painstaking and tactful medical history. These cases require protracted and expensive treatment if finally accepted and instead of constituting a numerical asset to the Marine Corps are a sanitary burden. After numerous statistical researches I have long been convinced of the vital truth of Medical Director Gatewood's dictum that "the health of a navy is primarily in the hands of the medical officers at the recruiting stations."

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[1] Extract from Annual Sanitary Report, Navy Yard, Mare Island, Cal., 1916.

PROBLEMS OF VENEREAL PROPHYLAXIS.[1]

By M. B. Hiden, Assistant Surgeon, United States Navy.

Believing that moral educational prophylaxis and medical venereal prophylaxis could be coordinated into a system where both could be used to the fullest extent without conflict between either method, it is recommended that each of these methods be fully used in the Navy and handled according to the recommendations of the highest authorities on each subject. This would probably mean putting medical venereal prophylaxis on a practical and strict "public health basis" and so correlating educational prophylaxis that they would work in harmony and would each be a very helpful adjunct to the other.

It seems very important that the Navy, especially in this part of the world, should have some supervision and a certain amount of control of the sanitary conditions surrounding the enlisted man while on liberty. The disgustingly low grade of barrooms and the almost criminally infected brothels that often grow up around a navy yard or naval port, living like poisonous parasites on the naval personnel, should convince us all that radical steps looking to immediate improvement should be taken at once.

There is no place in the Far East where the conditions are good. They range from fair to the very worst that could possibly be imagined. In some places they are so bad as to make their existence, from a white man's point of view, nothing short of criminal. A system of coordination, harmonization and full utilization of sanitary supervision ashore, public health venereal prophylaxis and educational prophylaxis is a crying need in our Navy to-day. Any one method will fail causing us to despair of conditions ever being any better. All these means combined will reduce venereal disease far beyond our present hopes and expectations.

In a great many places on this station there is absolutely no place for the enlisted man to go while on liberty except to the very worst bars and lowest type of bawdyhouses. The inmates of such establishments seem to be the only people anxious to give them a warm welcome.

Enlisted men's clubs, run on a liberal, broad-minded basis, should be established in all prominent naval ports and every other means should be taken to encourage the men to keep away from the dives. Then for the sake of the small class who would in spite of everything continue to patronize them, these resorts should be put on a better plane and compelled to reduce the danger they furnish to a minimum. This could easily be done in many places through cooperation with the civil officials.

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[1] Extract from Annual Sanitary Report, U. S. S. *Monadnock*, 1916.

SANITARY NOTES ON LIBERIA.[1]

By D. G. ALLEN, Passed Assistant Surgeon, United States Navy.

While at Monrovia, Liberia, the following information was obtained: Monrovia is the capital and seaport town of Liberia. It is situated in 6° 19′ north latitude and 10° 50′ west longitude. It consists of two sections; a civilized quarter inhabited by a few hundred Americo-Liberians and a few European merchants, etc. This section is built on the top of the plateau of Cape Mesurado, which rises to an altitude of about 290 feet above sea level. The second section of the city is the native quarter, consisting of a large collection of thatched huts built along the water front. A lagoon, which is really the harbor of Monrovia, communicates with the sea by a narrow channel across a sand bar. It can be entered by surf boats only. Occasionally the bar is dangerous, boats are swamped and the occupants drowned. Ships have to anchor outside in the open sea, where, owing to shallow water, currents and tides, they roll incessantly.

Ships usually anchor 1 mile from shore and sufficient protection against mosquitoes was obtained by forbidding communication with the beach at night. The population is variously estimated at from six to ten thousand. The climate is equatorial. There is a dry season between November and April. The middle of the year is regarded as the coolest time of the year, although the lowest temperatures are recorded between December and March. The highest dry temperature seldom goes above 89 F, and at night seldom goes below 74 F. The temperature, while never excessively high, is nearly always associated with a relatively high humidity.

During about eight months of the year a moderate sea breeze blows from the South. During December, January and February the wind blows from the Sahara Desert, and is at times laden with a fine desert sand. While it blows the inhabitants complain of dryness of the mucous membranes and affections of the respiratory tract. Pneumonia is also more prevalent. The annual rainfall is about 153 inches. The most unhealthy months of the year seem to be September and October. For the white population the climate is most enervating; so much so, in fact, that in Sierra Leone, adjacent to Liberia and with similar climate, the whites of the colonial and military services are required to spend but one year on duty in the colony, after which a four months' furlough at home is allowed.

The sources of the water supply are surface wells, springs, and streams. No measures to prevent contamination are employed. Toward the end of the dry season the supply becomes very low. Though very little typhoid exists dysentery and diarrheal diseases are prevalent. No sewerage system exists, the natural slope of the land providing fairly good drainage. Pigs roam the streets, and along the Kree quarter the beach is so foul that swimming parties should avoid this part of the beach. The food supply is poor and expensive. Ships on duty here must go to Freetown, Sierra Leone, for provisions.

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[1] Extract from Annual Sanitary Report, U. S. S. *Chester*, 1916.

There are no hospitals. The French Colonial service maintains a small dispensary. There are two physicians, Dr. Furzeck, a medical officer of the Hungarian Army, and a native physician, a graduate of a medical school in the United States. There are no epidemic diseases, the prevailing diseases being malaria, diarrhea and venereal diseases. Syphilis is very prevalent. Prostitutes are numerous and there are no regulations regarding them nor any examination. The malarial fever is mostly of the benign type. There is no yellow fever or smallpox, but several cases of elephantiasis as well as leprosy and ulcers of the skin were seen in the streets. The most frequent causes of death among the whites are malaria, black-water fever, dysentery, pneumonia, and alcoholism. Culex, anopheles, and stegomyia mosquitoes were seen as well as a few glossina palpalis flies. The other Liberian ports visited were like Monrovia as regards climate, water supply, prevailing diseases, etc., except that they were smaller and the population consisted mostly of natives.

SANITARY NOTES ON THE WEST COAST OF MEXICO.[1]

By C. B. CAMERER, Passed Assistant Surgeon, United States Navy.

Mazatlan, Sinaloa, Mexico.—The *Buffalo* was frequently in and out of this port, being assigned to patrol duty along the coast between here and Manzanillo for several months. At present sanitary conditions, while bad, are improved over what they were found to be earlier in the year. The mortality is high, averaging 23 weekly for the period from July 4 to November 14, inclusive. The present population is stated to be about 20,000, but this number fluctuates considerably owing to military movements, etc., the soldiers taking their women and families with them on the march or in garrison, as the case may be.

The birth rate is high, but infant mortality is also very high, most deaths being due to gastro-intestinal complaints, inanition and infections, tetanus playing an important role in case of new-born infants, due to environment and filthy obstetrical work. The water supply is constant and is taken from the Presidio River, at a point 9 miles distant, being conveyed to the city in iron and wooden pipes about 1 foot in diameter.

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[1] Extract from Annual Sanitary Report, U. S. S. *Buffalo*, 1916.

There is a sand-gravel filtering basin located at the inlet, but it has not been cleaned for several years and is reported as in poor condition and very dirty. Most of this distance the pipe is above the surface and nearly every joint observed appeared to be leaking and opportunities for contamination were legion. There are two sewerage systems, one gravity and the other worked by suction pumps, both discharging into the sea about 100 meters from the beach. Both are are in satisfactory operation at present. There are three hospitals, two public, the Hospital Militar and the Hospital Municipal, and a small private institution with a capacity of 10 beds, which is not open at present and was not visited. It is maintained wholly by private funds and is stated to be meagerly equipped at best.

(*a*) *Hospital Militar.*—A large, one-storied building, built in the usual Spanish manner of adobe and cement, has a capacity of 300 beds. The wards were fairly clean, but the operating equipment was very meager and that observed was in a poor and often unserviceable condition. The one autoclave sterilizer installed was broken and could not be used, the containers fitting therein being used as receptacles for bread, etc. There are no bathing facilities, except of the most primitive type, and the toilets are both crude and insanitary.

There were about 120 inmates at the time of my visit, principally syphilitics, cripples who had undergone amputations, chronic malarial, hepatic, and renal cases. Drugs and appliances of all kinds are very scarce and costly and the pharmacy was nearly empty.

(b) *Hospital Municipal.*—The wards were fairly clean. The operating suite is poorly arranged and lighted, the equipment is fair, but the methods for sterilization are poor and untrustworthy. The insane pavillion contains 13 cells, which I found all occupied, and was in a very unsanitary condition, the inmates showing neglect and being offensively filthly.

The pharmacy was very poorly and scantily supplied with drugs and chemicals, surgical dressings being also very scarce. *This building, or rather group of buildings, could readily be utilized by a force of occupation with excellent results, being well built, accessible, and commodious.* It is stated to have a capacity of 800 beds, and this is probably true. Both men and women are treated here at municipal expense, and the attending physicians and surgeons are employed thereby.

There is also a small "lazaretto" for contagious cases on the outskirts of the city. No opportunity for visiting it presented itself, but it is stated to be fairly well administered and equipped, and is also a municipal institution.

Las Penas, Jalisco, Mexico.—This small village is not on a railroad and has a population of about 100, there being no quarantine officer here nor any hospital and but one native medical practitioner. The water supply comes from wells and the high hills surrounding the town on three sides and is reported to be of excellent quality. Drainage is by natural means only. The people observed were personally clean, but syphilis, tuberculosis, and excessive malaria are reported to be prevalent, especially the latter, both due to lack of quinine and to negligence. There is no pier nor landing stage, boats going in through the surf. Provisions appeared ample and to be of good quality.

San Blas, Tepic, Mexico.—At present the greatest cause for local concern appears to be the extensive prevalence of malaria, which, as before stated, is due both to lack of quinine and negligence on the part of the inhabitants. Quarantine is observed in a very perfunctory way and reports are apt to prove untrustworthy. There are no institutions for the care of the sick. The streets were quite dirty and garbage was scattered everywhere. There is no water supply system here excepting wells and drainage is by natural means. One native practitioner is reported as located here.

Miramar, Tepic, Mexico.—This small village is situated directly on the beach and is surrounded by high hills and mountains. The population is placed at about 175, of whom 4 are white, all Germans, engaged in manufacturing soap from coconut oil. There is a good wooden pier; the houses are all of thatch or of frame. Water for consumption is obtained from some excellent springs nearby and the supply is constant and adequate. Drainage is by natural means. No physician is located here and but little sickness exists. The people are clean and industrious. Food is abundant and excellent in quality. A guard of 17 soldiers was stationed here at the time of our visit.

Chamelas Bay and town, Jalisco, Mexico.—This bay is really but slightly protected, and the surf is heavy. The surrounding country is sparsely settled and well wooded and abounds with game. The crew was permitted to go ashore frequently for bathing, hunting and fishing; few, if any, natives were encountered.

Chamelas.—This village is located about 6 or 8 miles from where the *Buffalo* was anchored, in the shelter of a small chain of islands. There is no pier and boats run up on the beach. There are about 150 inhabitants, nearly all Indians, with one or two whites. The buildings are principally wretched huts of wattles and thatch, all infested with myriads of vermin, but no typhus has been observed. Malaria and syphilis are both extremely prevalent, many cases of cachexia and enlarged spleen in case of the former and numerous secondary and tertiary lesions in the latter instance being observed. There are no government officials here, quarantine is not observed and there are neither physicians nor hospitals.

The water supply is derived from shallow wells sunk in dry beds of watercourses and is of poor quality and uncertain quantity. Gastro-intestinal complaints are numerous and the death rate is reported as high. Medical attention was given to many of these people and small amounts of quinine and mercury dispensed. The food supply is limited in great part to maize and meat of an inferior quality and abscesses and defective teeth are most prevalent. There is no attempt at sanitation or the enforcement of hygienic principles.

Tenacatita Bay, Jalisco, Mexico.—This small bay was visited only for a few hours and no opportunity for landing presented itself. There is no settlement along the beach. The water here is very dirty and contains an immense amount of a fine red moss, giving the water the appearance of blood. Some of this water was centrifuged and examined microscopically and found to contain the fine reddish moss referred to. No infusoria, etc., were observed. The mountains come close to the seashore and appear well wooded. No natives were seen along the beach.

Navidad Bay, Jalisco, Mexico.—This bay is very similar to the foregoing as to size, but the water appeared much cleaner. There is an immense salt lagoon back of a sandy beach, which is accessible to small boats. The surrounding country is thickly wooded and quite marshy for a considerable distance inland and mosquitoes are present in clouds. There is a small native village situated upon the sandy peninsula referred to, with about 45 native inhabitants, all more or less intimately concerned with the salt works located here, salt being manufactured in shallow, evaporating basins lined with cement. The houses consist wholly of straw shacks.

There are no Government officials here, neither is there a medical man. The few people seen were principally of the poor peon class and apparently subsisted on maize, chickens, and pigs, with a little fruit occasionally. No cases of sickness were reported. Water for drinking purposes is derived from shallow wells and is very brackish. Sanitation as such does not exist. Food, such as it is, seemed fairly plentiful. Members of a hunting party returning to the ship were found to be infected with the larvæ of Hæmophysalis punctata, specimens of which were mounted and forwarded to the Naval Medical School.

Manzanillo, Colima, Mexico.—This is a notoriously unhealthful port. What little sanitation existed heretofore has deteriorated. Quarantine is still perfunctorily observed, but the acting United States consul states that the health reports are not trustworthy and not to be given any weight. Malaria is very prevalent and deaths therefrom frequent, due, as stated heretofore, to carelessness, indolence and an actual dearth of quinine.

Venereal diseases and gastro-intestinal complaints are numerous. One well-advanced case of pellagra was observed and prescribed for, and many other cases are reported as present. The streets and spaces about dwellings were noted to be uniformly filthy and the market excessively so. The death rate among all ages is very high, this also applying to transients, e. g., the great number of soldiers and camp followers continually passing through here and living for variable periods of time in deplorably insanitary surroundings.

Mosquitoes, breeding in the large lagoon back of the town, were present in great numbers, and found their way out to the vessel anchored over 1 mile from the beach. So bad have been the health conditions at this port for the past year that orders were issued for all vessels remaining at anchor here overnight to have quinine prophylaxis administered to all hands daily. This has been carried out on the two occasions the *Buffalo* was in port overnight.

ANALYTICAL METHODS USED AT THE NAVAL MEDICAL SUPPLY DEPOT, NEW YORK, FOR TESTING ABSORBENT COTTON.

Absorbent cotton, in rolls of 1 pound net each; to be fully bleached, soft, fine filaments, with average length of 1 inch for fiber; to show no trace of an acid or alkaline reaction; to be free from visible impurities and deprived of fatty and waxy matter; to contain no excess of moisture and to conform to the following standards when determined by the prescribed methods:

Length of fiber.—Average length, 1 inch.

On a clean glass slide 10 fibers are stripped to full length, this by the aid of a drop of distilled water; the water evaporated in dry air and the fibers accurately measured.

Reaction.—Neutral.

Four grams of the cotton placed in an Erlenmyer flask, add 400 mils distilled water, connect flask with reflux condenser and heat on a bath of boiling water for two hours; cool, filter and divide filtrate in portions of 200 mils each; to the first portion add three drops of phenolphthalein test solution, to the second portion add one drop of methyl orange test solution; neither portion should develop a pink color.

Absorbing properties.—Not less than 16 parts of distilled water.

One gram of cotton placed in a beaker of 200-mil capacity, add 25 grams distilled water, temperature 25 C.; allow to stand 10 minutes; without disturbing cotton drain (by holding same in horizontal position) for 15 seconds into a measuring jar; the amount of water so recovered should not measure more than 9 mils at 25 C.

Moisture (part).—4.5 per cent.

Five grams of cotton dried at a temperature of 104 C. for a period of three hours, then cooled in a desiccator, should not lose more than 4.5 per cent in weight.

NOTE.—This does not represent the total moisture, although the limit of 4.5 per cent is only exceeded under the above treatment when undue amounts of moisture are originally present.

Water extract.—Total, 0.30 per cent.

Five grams of the cotton placed in a beaker and covered with 500 mils of distilled water and heated during one hour on a bath of boiling water; the hot aqueous extract filtered through good quality filter paper and the extraction of cotton repeated with 200 mils of distilled water, heated and filtered as before; cotton transferred to filter and washed with 300 mils of boiling water; filtrates then concentrated and transferred to a platinum dish and dried at 100 C. to constant weight. The total residue obtained by this method should not represent more than 0.30 per cent of the weight of the cotton extracted.

Ether extract.—0.55 per cent.

Five grams of cotton wrapped in fat-free filter paper and placed in a Soxhlets extraction apparatus, extracted with ether during three hours; the flask of the apparatus dried at 100 C. to constant weight. The total residue obtained by this method should represent not more than 0.55 per cent of the weight of cotton extracted.

Alcohol extract.—0.55 per cent.

Five grams of cotton wrapped in fat-free filter paper and placed in a Soxhlets extraction apparatus, extracted with alcohol (U. S. P.) during three hours; the flask of the apparatus dried at 100 C. to constant weight. The total residue obtained by this method of extraction should represent not more than 0.55 per cent of the weight of cotton extracted.

Ash.—0.2 per cent.

Three grams of cotton placed in a weighed platinum crucible and incinerated should leave not more than 0.2 per cent ash.

U. S. NAVAL MEDICAL SCHOOL LABORATORIES.

Additions to the pathological collection, United States Naval Medical School, March–June, 1916.

Accession No.	Tissue.	Diagnosis.	Collected by or received from—
1178	Nasal smears	Leprosy	Asst. Surg. C. Baker.
1179	Horseshoe kidney		Medical Director P. Leach.
1180	Cysts	Simulating hernia	Passed Asst. Surg. W. L. Mann.
1181	Heart	Myocarditis	Passed Asst. Surg. J. J. O'Malley.
1182	Blood smears	Malaria	Asst. Surg. C. R. Baker.
1183	do	do	Surg. J. A. Randall.
1184	Tumor	Sarcoma	Medical Inspector G. A. Lung.

Additions to the helminthological collection, United States Naval Medical School, March–June, 1916.

Accession No.	Parasite.	Host.	Collected by or received from—
19928	Ascaris, ova	Homo	Medical Director E. R. Stitt.
19929	T. saginata	do	Dr. S. L. Owens.

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